INTRODUCTION / SUMMARY

Q. PLEASE STATE YOUR NAME, OCCUPATION AND ADDRESS.

A. My name is Stephen G. Hill. I am self-employed as a financial consultant, and principal of Hill Associates, a consulting firm specializing in financial and economic issues in regulated industries. My business address is P. O. Box 587, Hurricane, West Virginia, 25526 (e-mail: sghill@compuserve.com).

Q. BRIEFLY, WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. After graduating with a Bachelor of Science degree in Chemical Engineering from Auburn University in Auburn, Alabama, I was awarded a scholarship to attend Tulane Graduate School of Business Administration at Tulane University in New Orleans, Louisiana. There I received a Master's Degree in Business Administration. More recently, I have been awarded the professional designation "Certified Rate of Return Analyst" by the Society of Utility and Regulatory Financial Analysts. This designation is based upon education, experience and the successful completion of a comprehensive examination. I have also recently been elected to the Board of Directors of that national organization. A more detailed account of my educational background and occupational experience appears in Appendix A.

Q. HAVE YOU TESTIFIED BEFORE THIS OR OTHER REGULATORY COMMISSIONS?

A. While I have not previously presented testimony previously in this jurisdiction, I have testified on cost of capital, corporate finance and capital market issues in over 200 regulatory proceedings before the following regulatory bodies: the West Virginia Public Service Commission, the Texas Public Utilities Commission, the Oklahoma State Corporation Commission, the Public Utilities Commission of the State of California, the Public Service Commission of the State of Maine, the Arizona Corporation Commission, the Public Utilities Commission of the State of Minnesota, the Ohio Public Utilities

Commission, the Insurance Commissioner of the State of Texas, the North Carolina Insurance Commissioner, the Rhode Island Public Utilities Commission, the City Council of Austin, Texas, the Missouri Public Service Commission, the South Carolina Public Service Commission, the Public Utilities Commission of the State of Hawaii, the New Mexico Corporation Commission, the Wisconsin Public Service Commission, the State of Washington Utilities and Transportation Commission, the Public Service Commission of Utah, the Illinois Commerce Commission, the Kansas Corporation Commission, the Indiana Utility Regulatory Commission, the Virginia Corporation Commission, the Public Service Commission of Maryland, the Pennsylvania Public Utilities Commission, the Public Service Commission of Montana, the Vermont Public Service Board, the Federal Communications Commission and the Federal Energy Regulatory Commission. I have also testified before the West Virginia Air Pollution Control Commission regarding appropriate pollution control technology and its financial impact on the company under review and have been an advisor to the Arizona Corporation Commission on matters of utility finance.

O. ON BEHALF OF WHOM ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of the New Hampshire Office of the Consumer Advocate (OCA).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been requested by the Office of the Consumer Advocate to present a forward-looking cost of capital analysis for the local exchange network operations of Verizon-New Hampshire (V-NH, the Company), a subsidiary of Verizon, a diversified telecommunications holding company. As part of my analysis, I recommend and testify to the overall rate of return I believe should be utilized in determining the unbundled network element (UNE) costs for the Company in this proceeding. As part of the process of determining an appropriate overall return to be used in UNE costing, I also discusses the differences and similarities between determining overall capital costs for a UNE proceeding and a traditional rate case, and provide an overall cost of capital determination which would be appropriate for a traditional rate proceeding.

In addition, I comment on the cost of capital testimony submitted by Company witness, Dr. James H. Vander Weide, pointing out the shortcomings contained therein.

Q. HAVE YOU PREPARED EXHIBITS IN SUPPORT OF YOUR TESTIMONY?

A. Yes. Exhibit_(SGH-1), attached to this testimony, consists of 14 Schedules and provides the analytical support for the conclusions reached regarding the forward-looking overall cost of capital for V-NH's local exchange operations presented in the body of this testimony. This Exhibit was prepared by me and is correct to the best of my knowledge and belief. Also, I have provided four Appendices ("A" through "D"), which contain additional detail regarding certain aspects of my narrative testimony in this proceeding.

Q. PLEASE SUMMARIZE YOUR TESTIMONY AND FINDINGS CONCERNING THE RATE OF RETURN THAT SHOULD BE UTILIZED IN SETTING RATES FOR V-NH's UTILITY OPERATIONS IN THIS PROCEEDING.

A. My testimony is organized into four sections. First, I discuss the cost of capital standard as a measure of the return to be allowed for regulated industries, and review the current economic environment in which the equity return estimate is made. Second, I review the capital structure requested by V-NH for ratemaking purposes in comparison to capital structures employed by the Company historically as well as those existing in the utility industry, generally. Also, I discuss the use of both book value and market value capital structures in relation to the determination of the overall cost of capital in both a UNE cost determination and a traditional rate case.

Third, I evaluate the cost of equity capital for similar-risk operations using Discounted Cash Flow (DCF), Capital Asset Pricing Model (CAPM), Modified Earnings-Price Ratio (MEPR), and Market-to-Book Ratio (MTB) analyses. Fourth, I comment on the pre-filed capital structure and cost of capital testimony submitted by Company witness Dr. James Vander Weide.

I have estimated the equity capital cost of the local exchange telephone operations of Verizon-New Hampshire to be in the range of 10.50% to 11.75%. Within that broad range, a reasonable estimate of the current cost of equity capital for the Company is in the lower portion of that range, or 10.50% to 11.125%. Utilizing a 10.50% to 11.125% equity cost rate range with a current marginal cost of debt of 6.79% and a reasonable range of cost-setting capital structures, produces an overall cost of capital range for V-NH's unbundled network leasing operation of 8.831% to 9.243% (see Exhibit_(SGH-1), Schedule 12). I recommend that the Commission rely on a cost of capital estimate within that range for the purpose of setting long-run incremental local loop costs for Verizon-New Hampshire in this proceeding. (Exhibit_(SGH-1), Schedule 12, page 1 of 2)

Also, using the current cost of equity capital range determined in my analysis (10.50%-11.125%), and applying that cost range to the Company's recent average book value capital structure (45% equity/55% debt) and embedded cost of debt (7.051%), as would be done in a normal base rate proceeding, the Company's overall cost of capital would range from 8.603% to 8.884% (Exhibit_(SGH-1), Schedule 12, page 2 of 2)

Q. WHY SHOULD THE COST OF CAPITAL SERVE AS A BASIS FOR THE PROPER ALLOWED RATE OF RETURN FOR A REGULATED FIRM?

A. The Supreme Court of the United States has established, as a guide to assessing an appropriate level of profitability for regulated operations, that investors in such firms are to be given an opportunity to earn returns that are sufficient to attract capital and are comparable to returns investors would expect in the unregulated sector for assuming the same degree of risk. The Bluefield and Hope cases provide the seminal decisions [Bluefield Water Works v. PSC, 262 US 679 (1923); FPC v. Hope Natural Gas Company, 320 US 591 (1944)]. These criteria were restated in the Permian Basin Area Rate Cases, 390 US 747 (1968). However, the Court also makes quite clear in Hope that regulation does not guarantee profitability and, in Permian Basin that, while investor interests (profitability) are certainly pertinent to setting adequate rates, those interests do not exhaust the relevant considerations.

As a starting point in the rate-setting process, then, the cost of capital of a regulated firm represents the return investors could expect from other investments, while assuming no more and no less risk. Since financial theory holds that investors will not provide capital for a particular investment unless that investment is expected to yield their opportunity cost of capital, the correspondence of the cost of capital with the Court's guidelines for appropriate earnings is clear.

I. ECONOMIC ENVIRONMENT

Q. WHY IS IT IMPORTANT TO REVIEW THE ECONOMIC ENVIRONMENT IN WHICH AN EQUITY COST ESTIMATE IS MADE?

A. The cost of equity capital is an expectational, or *ex ante*, concept. In seeking to estimate the cost of equity capital of a firm, it is necessary to gauge investor expectations with regard to the relative risk and return of that firm, as well as that for the particular risk-class of investments in which that firm resides. Because this exercise is, necessarily, based on understanding and accurately assessing investor expectations, a review of the larger economic environment within which the investor makes his or her decision is most important. Investor expectations regarding the strength of the U.S. economy, the direction of interest rates and the level of inflation (factors that are determinative of capital costs) are key building blocks in the investment decision. They should be reviewed by the analyst and the regulatory body in order to assess accurately investors' required return—the cost of equity capital.

Q. WHY DO YOU BELIEVE AN EQUITY RETURN IN THE RANGE O F 10.50% TO 11.75% IS REASONABLE FOR LOCAL EXCHANGE TELEPHONE COMPANIES IN TODAY'S ECONOMIC ENVIRONMENT?

A. Although there was an upward movement in interest rate levels during 1999 and 2000, that movement reversed course during 2001 and has continued a decline to lower levels in 2002 (see Exhibit_(SGH-1), Schedule 1, page 1). Recently, lows in the 10-year U.S. Treasury Bond yields were established which have not existed in this economy in almost 40 years (*Wall Street Journal*, August 14, 2002, p. C1). The overall level of fixed-income capital costs has been relatively low by historical standards for several years, and is especially low at the current time. Moreover, the Federal Reserve (the Fed) very recently lowered interest rates again. Also, there are many examples in the marketplace for equities that indicate that investor return requirements remain relatively low by historical standards.

For example, recent investor service reports regarding the gas distribution industry indicate that investment return expectations in that regulated industry are quite modest by historical standards. As this Commission is certainly aware, the energy utility industry has changed dramatically in recent years as restructuring is underway in both the electric and gas businesses. Therefore, while carrying less risk than telecommunications companies generally, gas utilities face the same kind of competitive (i.e., bypass) risks faced in the local exchange telephone industry, and, thus, can provide an indication of the lower end of investors' return expectations for local exchange telephone companies.

A recent A.G. Edwards report on the gas utility industry[1] indicates that market return expectations for gas utility stocks are below historical earned returns. That investor service publication reports that, for a sample of 15 large and small gas distributors, the median total return expectation (dividend yield plus expected growth—a DCF-type calculation) is approximately 9.4%.

Those data confirm that my 10.50%-11.75% equity return range for the local exchange operations under consideration here is conservative and, in fact, may be overly generous. In addition, those data represent information to which investors are exposed in the equity marketplace for rate-regulated companies and underscore the fact that, currently, investor return requirements for that type of equity investment are relatively low.

Q. ARE THERE OTHER INDICATIONS THAT CAPITAL COSTS ARE CURRENTLY RELATIVELY LOW?

A. Yes. Another indication of the reason investors are willing to buy and hold stocks that offer relatively low returns is shown in Exhibit__(SGH-1), Schedule 1, page 1, which depicts Moody's A-rated utility bond yields from 1984 through August, 2002. Page 1 of

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[1] A.G. Edwards, "Gas Utilities Quarterly Review," September 30, 2002.

Schedule 1 shows that interest rates and capital costs remain quite low relative to the interest rate levels that existed in the mid-1980s. Also, page 2 of Schedule 1 (Exhibit__(SGH-1)), which presents the year-average Moody's A-rated bond yields for each year over the past 32 years (1968-2002), shows that A-rated bond yields thus far in 2002 are only slightly higher than the average bond yield levels seen in the U.S. in the late 1960s and early 1970s (prior to the 1974 oil embargo). Also, the most recent average A-rated utility bond yield, 6.79%[2], falls in the lower range of interest rates that have existed over the past 30 years.

The above data indicate that capital costs, with the recent credit loosening by the Federal Reserve, remain at relatively low levels and generally support the efficacy of my range of equity capital costs. However, it is important to note here that equity capital cost rates and bond yields do not move in lock-step fashion over time. In fact, the variability of that return differential is a fundamental reason why risk premium type analyses—which attempt to quantify the additional return over bond yields required by equity investors—are not reliable as primary indicators of equity capital cost. Therefore, it is necessary to perform an independent cost of equity capital analysis, rather than to simply "index" the cost of capital to current interest rates.

Q. PLEASE BRIEFLY DESCRIBE THE INTEREST RATE CHANGES THAT HAVE OCCURRED IN THE U.S. ECONOMY OVER THE PAST FEW YEARS AND HOW THEY IMPACT CAPITAL COST RATE EXPECTATIONS FOR THE FUTURE.

A. The substantial interest rate decline that occurred following the historically-high interest rates in the early 1980s spurred increased economic activity in the U.S. The rate of growth in the U.S. Gross Domestic Product (GDP) began to increase at a rapid rate by the end of 1987 and showed signs of continuing to gain strength. That increased economic activity, in turn, led to increased inflation expectations (a rapid rate of economic growth creates shortages in labor and materials, driving up the price of those factors of production, which ultimately results in higher prices in all sectors of the economy). The expectation of increased inflation, in turn, caused the Fed to act aggressively to slow down what was widely believed to be an overheating economy. The very sharp interest rate rise that followed in late 1987 and 1988, shown on Exhibit__(SGH-1), page 1 of Schedule 1, succeeded in damping down the economy, reducing inflationary pressures, and allowing interest rates to fall again.

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[2] Value Line *Selection & Opinion*, most recent six weekly editions (9/20/02-10/25/02, inclusive), 20/30-year A-rated utility bond yield averages.

Since that time, the interaction between the Federal Reserve's moves to expand or restrain the money supply and burgeoning inflation has continued to be a primary influence in the U.S. macro-economy and the level of interest rates. Overall, as inflation has remained calm and economic activity has been moderate, interest rates have trended downward, but that general downward direction has been interrupted when investors (and/or the Fed) believed that falling interest rates would spur too-rapid economic growth.

Rapid economic growth has, historically, created unwanted inflation. Investors, anticipating that higher inflation and interest rates might be the result of rapid economic expansion, have reacted to positive economic news (e.g., increasing GDP growth rates, lower unemployment) or negative inflation news (e.g., increasing commodity prices, factory capacity or labor shortages) by bidding down debt prices and driving up interest rates. That is precisely the economic situation that fueled the more recent interest rate peaks from 1994 through the 2000/2001 period (see Exhibit__(SGH-1), Schedule 1, page 1).

As shown on page 2 of Schedule 1, single-A rated utility debt yielded about 7.6%, on average, in 1999, while, in 2000, equivalently rated debt was priced to yield approximately 8.2%, on average. That cost rate increase was due, primarily, to investors' concerns regarding the continued strength of the recent U.S. economic expansion (the longest peacetime expansion in U.S. history) and the potential for increased inflation caused by what was perceived to be a rapid (inflationary) level of growth.

However, that rapid rate of economic growth did not come to pass, and the interest rate increases engineered by the Federal Reserve in 2000 to slow down a rapidly growing economy worked a little too well, resulting in declining economic growth. Then, in response to an economy that was slowing down, the Fed elected to increase the supply of money by dramatically lowering the Federal Funds rate (the rate at which money center banks can lend funds on an overnight basis—a fundamental building block of capital costs in the U.S.). In order to revive what became a slowing economy, the Fed lowered short-term interest rates eleven times in 2001 (and again in early November 2002).

As Value Line notes in its most recent Quarterly Review regarding economic growth, inflation and the interest rate environment, the current expectation is that the Federal Reserve's recent monetary loosening will, during 2003, begin to slowly revive the economy. The economy showed some positive response to the Fed's credit-loosening in the first quarter of 2002, but that positive surge was cut short when investor confidence was shaken by corporate accounting/management scandals and escalating trouble in the Middle East. Importantly, with regard to the estimation of capital costs, inflation is expected to be moderate and interest rates will continue in the future at moderate levels preserving a favorable capital cost environment:

> **Economic Growth**: Following a very strong 5.0% increase in GDP in the opening quarter of 2002, the nation's economy pushed forward at a barely perceptible 1.1% during the second three months. That surprisingly weak showing swelled the ranks of those predicting that we would soon fall back into recession. A slowdown in consumer spending during part of the second quarter [Chart omitted], sluggish manufacturing activity [Chart omitted], the further erosion in the technology and telecom areas, and the lack of strong employment gains [Chart omitted] were all, according to some observers, setting the stage for a so-called double-dip recession. Indeed, as spring pushed into summer, only the housing and auto sectors (boosted by attractive financing rates) were demonstrating any sort of resilience. More recently, though, we have seen signs that the consumer is picking up the spending pace (as July retail and auto sales increased nicely), while the latest data brought another uptick in housing starts [Chart omitted]. These trends, along with moderately higher industrial production figures, augur well for overall growth stepping up a notch, to 2.5%, or so, in the current quarter, and to 3% over the final three months of the year [Chart omitted].
>
> **Inflation**: One of the hallmarks of the business expansion of the 1990s and the subsequent slowdown in activity

> during the early years of this century has been the absence of an inflation problem. High productivity, adequate supplies of relatively inexpensive raw materials, stable labor costs, and the absence of significant pricing power at the wholesale level (especially within the high-tech arena) have all contributed to one of the longest runs of pricing stability in memory. Such low inflation has afforded the Fed all the monetary flexibility it could ask. In fact, as 2002 winds down, inflationary pressures seem to be easing further, with the latest data showing a drop in producer (or wholesale) prices and muted consumer inflation. Moreover, absent a wholly unexpected surge in economic activity in the years ahead, or a prolonged conflagration in the oil-rich Middle East, it is rather hard to envision a scenario in which inflation would veer out of control. [Chart omitted].
>
> **Interest Rates**: Stability reigns here now, as well, as the Fed, following a succession of interest rate reductions in 2001, has been content to sit back and see whether or not its monetary program has performed to design. So far, the Fed appears to have been successful, as the recession has run its course and inflation has remained under control. The low inflation track gives the Fed the flexibility it needs to trim rates further should the economy not respond as favorably as we now believe it will over the next 12 to 18 months. For now, we believe the Fed will keep interest rates at current levels until well into 2003. [Chart omitted]. (The Value Line Investment Survey, *Selection & Opinion*, August 30, 2002, pp. 3423, 3424)

In that most recent Quarterly Economic Review, Value Line projects long-term Treasury bond rates will average 5.4% through 2002 and 5.7% through 2003. Since Value Line's commentary cited above, the economy has not shown signs of recovery and recent six-week average 30-year T-bond yields have fallen back to an average level of 4.8%—well below Value Line's expectations for 2002 (data from Value Line, *Selection & Opinion*, six weekly editions, September 20, through October 25, 2002). Therefore, the indicated expectation with regard to interest rates is that they are likely to rise somewhat from current levels but will continue to remain at relatively low levels over the next few years.

II. CAPITAL STRUCTURE

Q. WITH WHAT CAPITAL STRUCTURE DOES V-NH REQUEST RATES BE SET IN THIS PROCEEDING?

A. At page 34 of his Direct Testimony, Company witness Vander Weide indicates that Verizon-NH is basing its rate request on a hypothetical market value capital structure consisting of 75% common equity and 25% debt. Those capital ratios, according to Dr. Vander Weide are based on (but not equal to) the market-value capitalization of Standard & Poor's Industrial Composite and a group of telecom companies. That is, the dollar amounts of the equity and debt capital used to establish the percentages used in the weighted cost of capital are based on the market value of the capital of the S&P Industrials and telecom companies, not the value that appears on the books of account for those companies. The Company's requested capital structure and overall cost of capital are shown in Schedule 2, page 1, attached to this testimony.

Q. IS THE COMPANY'S CAPITAL STRUCTURE BASED ON EITHER THE MARKET VALUE OR THE BOOK-VALUE CAPITAL STRUCTURE OF VERIZON?

A. No. As shown on page 2 of Schedule 2, the current consolidated book-value capital structure of Verizon Communications (V-NH's parent company), consists of about 35.7% common equity and 64.3% long-term debt. Those data are published for investors in Verizon Communications' September 30, 2002 S.E.C. Form 10-Q—the parent company's quarterly report.

Page 2 of Schedule 2 also shows that Verizon's current market-based capital structure (i.e., the market value of its equity and debt) consists of about 58% common equity and 42% debt. The average of Verizon's market-based and book-based capital structures would, therefore, consist of approximately 47% common equity and 53% debt.

These data indicate that the Company's capital structure request contains substantially more high-cost common equity than is actually used by Verizon, whether one measures the capital structure with market values or book values. The result of that overstatement of Verizon's common equity capitalization would, if included in rates to be set in this proceeding, substantially overstate the Company's actual capital costs and unnecessarily increase rates to customers.

Q. IF VERIZON REALIZED THE OVERALL RETURN REQUESTED BY THE COMPANY IN THIS PROCEEDING, WHAT WOULD BE THE RESULTING RETURN ON COMMON EQUITY CAPITAL?

A. Page 2 of Schedule 2 also shows that if Verizon Communications were to earn the 17.93% overall return requested by V-NH in this proceeding, and its debt costs were equivalent to that which the Company requests, its return on book-value common equity—its profit—would be a whopping 36.93%. Even if one were to measure the return using market-value weights, a 17.93% overall return would afford Verizon approximately a 25% annual profit.

I've testified in regulated industries for more than 20 years and have never seen profitability requests of the magnitude evidenced here. The equity returns requested here are roughly *three times* the average return for the stock market, generally, according to widely-used historical data (Ibbotson Associates, SBBI, 2002, average market return ≈ 11.5%). In my view, the Company's requested return in this proceeding should be rejected on that basis alone. I will discuss V-NH's cost of capital analysis in more detail subsequently in Section IV of this testimony.

Q. MR. HILL, YOU HAVE USED THE TERMS "MARKET-VALUE CAPITAL STRUCTURE" AND "BOOK VALUE CAPITAL STRUCTURE". CAN YOU BRIEFLY EXPLAIN THE DIFFERENCE IN THOSE TWO TERMS?

A. Yes. A book value capital structure is probably most familiar to the Commission because it is the type of capital structure which is used in rate base/ rate of return rate cases. Simply put, the amounts of the different types of capital (equity, debt, preferred stock) are simply the amounts that appear on the regulated entity's books of account.

For the calculation of the common equity portion of a market-value capital structure, one must multiply the number of shares of common stock outstanding times the market price of the stock. That provides the total common stock value. Theoretically, in such a capital structure, the cost of debt should be calculated in the same way, i.e., the current market value of a particular type of bond times the number of bonds of that type outstanding. However those data are not as easy to obtain as common equity price, also the market price of debt is usually similar to the face value (unless substantial shifts in interest rates have occurred since the issuance of a particular debt series). Therefore, in practice, the market value of debt is often assumed to be similar to its book value, and the book value of debt is used for the purposes of calculating a market-based capital structure.

Q. AT PAGES 17 THROUGH 25 OF HIS DIRECT TESTIMONY IN THIS PROCEEDING, DR. VANDER WEIDE PROVIDES THE RATIONALE FOR THE USE OF A MARKET-BASED CAPITAL STRUCTURE, INDICATING THAT ITS USE IS WIDELY REFERENCED IN THE FINANCIAL LITERATURE AND THAT IT IS THE ONLY CAPITALIZATION THAT SHOULD BE CONSIDERED IN A FORWARD-LOOKING COST STUDY. DO YOU AGREE?

A. No. I do agree with Dr. Vander Weide that a market-weighted or market-based capital structure is widely referenced in the financial literature as appropriate for capital budgeting purposes; and, for that reason, I also agree that it should be given some consideration in setting long-run incremental costs for the local exchange loop. However, I strongly disagree that a market-based capital structure should be given sole consideration in this proceeding. There are many reasons why book value capital structures should also be given consideration in determining the Company's long-run incremental capital costs.

Q. PLEASE EXPLAIN WHY BOOK VALUE CAPITAL STRUCTURES SHOULD ALSO BE GIVEN CONSIDERATION IN DETERMINING LONG-RUN INCREMENTAL OVERALL CAPITAL COSTS FOR VERIZON-NEW HAMPSHIRE IN THIS PROCEEDING.

A. First, while there is certainly support in the financial literature for the use of market-based capital structures in determining the overall cost of capital, there is also support for the use of book value capital structures in the literature of corporate finance. For example, Michael Erhardt (The Search for Value: Measuring the Company's Cost of Capital, Harvard Business School Press, Boston, MA, 1994), himself a proponent of market-based capital structures, cites support by Elliot[3] and Beranek[4] for the use of book value weights in calculating the overall cost of capital for capital budgeting purposes. Other financial authors who recommend the use of market-based capital structure also recognize that book value weights can be used to determine the overall cost of capital:

> "The weights [of the capital components] could be based on the accounting values shown on the firm's balance sheet (book values), on the market values of the different securities shown on the balance sheet, or on management's estimation of the firm's optimal capital structure." (Brigham, E. F., Gapenski, L. C., Intermediate Financial Management, 5th Ed., Dryden Press, Fort Worth, TX, 1996, p. 190).

Second, surveys of financial managers, the corporate executives that actually make the capital budgeting decisions, indicate that book value weights as well as market value weights are used for that purpose. As Erhardt notes:

> "Which weights do companies actually use? In a survey of large firms, Brigham (1975)[5] finds that 29 of 31 respondents used book values: they did not indicate whether these were actual values or target values. Petry (1975)[6] reports that approximately one-half of a sample of 284 firms stated that they used market weights when they computed the weighted average cost of capital." (Erhardt, Op. cit., p. 76)

Brigham, in his 1996 text cited above, offers some rationale as to why financial managers seem to behave in a manner different than that recommended by the theorists (i.e., why they rely on book value weights in capital budgeting decisions rather than the market values he recommends):

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[3] Elliot, G. S., "Analyzing the Cost of Capital," *Management Accounting*, 62(6) (1980): 13-18.

[4] Beranek, W. "The Weighted Average Cost of Capital and Shareholder Wealth Maximization," *Journal of Financial and Quantitative Analysis*, 1977, 12(1), 17-31.

[5] Brigham, E.F., "Hurdle Rates for Screening Capital Expenditure Proposals," *Financial Management* 4(3) (1975): 17-26.

[6] Petry, G. H., "Empirical Evidence on Cost of Capital Weights, " *Financial Management* 4(4) (1975): 58-65.

> "Business executives prefer stability and predictability to volatility and uncertainty. Book values are far more predictable than market values. Further, a financial manager can set a target book value capital structure and then attain it, right on the money. It would be virtually impossible to stay at a target market value structure because bond and stock prices fluctuate. This is one reason why executives focus on book value structures rather than the more logical market value structures." (Brigham, Op. cit., p. 426)

Brigham also notes that if managers focus on book values (and his research shows that many do), the weighted cost of capital should be calculated based on book values:

> "...if a company focuses on a book value capital structure, seeks to maintain that structure, and finances in accordance with book value weights, then its weighted average cost of capital should be based on book weights." (Brigham, Op. cit., p. 426)

Third, book value capitalization data is far more prevalent in financial reporting than is market value capital structure information. In fact, in the financial data provided to investors, market-based capital structures are rarely reported. V-NH's parent company, Verizon Communications, in its reports to the Securities and Exchange Commission provides book value capital structures, not market value capital structures. Investor services such as Value Line and Standard & Poor's, report book value capitalization figures for the companies they follow, not market value capital structures. Bond rating agencies publish ratings benchmarks based on book value debt/equity ratios, not market value debt/equity ratios. Therefore, it is primarily book value capital structure information to which investors are exposed during their assessment of equity investment opportunities, and, if markets are informationally efficient (a fundamental assumption in cost of equity estimation and modern financial economic theory), book value capital structure data deserve consideration in the estimation of an overall cost of capital, because those data are incorporated into the stock prices that investors are willing to provide.

Fourth, book value capital structures are less volatile that are market-based capital structures. The former is based on the actual dollar amount of capital used to finance the assets of a firm while the latter is a function of whatever the market price happens to be. If a firm's stock price is $5/share one day and, perhaps due to disappointing earnings or some other factor, investors take a negative view of the stock causing the price to fall to $2/share the market-based capital structure would change dramatically from day-to-day.

Fifth, an analysis of the fundamental assumption behind the use of a market-based capital structure, in conjunction with the proportions in which the Company has actually utilized external sources of financing, also indicates that the sole consideration of market-based capital structure weights in this proceeding is unwise.

Q. PLEASE EXPLAIN WHAT YOU MEAN BY, "THE FUNDAMENTAL ASSUMPTION BEHIND THE USE OF MARKET-BASED CAPITAL STRUCTURE."

A. In capital budgeting, the purpose of a weighted average capital structure is to estimate the overall cost of capital of the particular project being evaluated. The proportions or weights of each type of capital are multiplied by the marginal cost of each type of capital to obtain the overall cost of the project. The "fundamental assumption" is that the proportions of the types of capital used in the weighted cost of capital *are equivalent to* the capital proportions actually used to fund the project.

Therefore, the assumption implicit in the use of Verrizon-NH's market-based capital structure is that new plant investment will be made with the same proportions of capital that exist in the market-based capitalization. If the financing of the new (or incremental) plant is undertaken with a capital mix other than that which exists in the market-based capital structure, then that market-based capital structure is not appropriate for use in calculating the weighted-average marginal cost of capital.

Q. IS THERE EVIDENCE THAT THE COMPANY IS FINANCING ITS PLANT INVESTMENT IN PROPORTIONS OTHER THAN THOSE WHICH EXIST IN THE MARKET-BASED CAPITAL STRUCTURE REQUESTED BY THE COMPANY?

A. Yes. A review of Verizon's cash flow statement over the past two years (2001, 2002), provided in the September S.E.C. Form 10-Q statement of Verizon New England, indicates that the mix of external capital with which the Company has financed its plant is substantially different from its market-based capitalization. The cash flow data for Verizon New England Telephone extracted from its most recent S.E.C. Form 10-Q filing indicates that over the last two years the external sources of financing utilized by Verizon consisted of $8.7 Million in equity infusions from its parent and $1,458.1 Million in proceeds from the issuance of long-term debt. That data indicates a ratio of external financing consisting of roughly 0.6% equity and 99.4% debt.

Q. MR. HILL, ARE YOU SUGGESTING THAT THIS COMMISSION USE A 0.6% EQUITY RATIO TO SET MARGINAL CAPITAL COST RATES FOR VERIZON-NH IN THIS PROCEEDING?

A. No. I offer that information regarding the manner in which Verizon has actually utilized external debt and equity funds in recent financing operations merely as evidence that 1) the assumption implicit in the use of a market-based capital structure, i.e., that the incremental plant added by the Company will be financed in precisely the same proportions as that which currently exist in the market-based capitalization, is not an accurate assumption, 2) sole reliance on a market-based capital structure for estimating the Company's long-run marginal cost would not necessarily be representative of the actual costs incurred, and 3) a more balanced approach which considers both market-based and book value-based capital structures would provide a more reasonable estimate of the long-run overall cost of capital.

Q. IS THERE ADDITIONAL EVIDENCE WHICH SUPPORTS THE CONSIDERATION OF BOOK VALUE-BASED CAPITAL STRUCTURES AS WELL AS MARKET-BASED CAPITAL STRUCTURES?

A. Yes. Dr. Vander Weide and I have testified previously in UNE cost proceedings in Vermont (Docket No. 5713 – Phase II). In that prior proceeding I requested that Dr. Vander Weide provide any studies of which he was aware that supported the notion that financial managers used market value rather than book value capital structures in capital budgeting. In response to that request, he provided a *Financial Management* article by Gitman and Mercurio [Lawrence J. Gitman and Vincent A. Mercurio, "Cost of Capital Techniques Used by Major U.S. Firms: Survey and Analysis of Fortune's 1000," *Financial Management*, Winter 1982, pp. 21-29]. Below is reproduced the table from that article which shows the results of their survey with regard to the types of capital structures used by financial managers:

TABLE I.

Capital Structures Used by Financial Managers

Use cost of specific source of financing planned for funding the alternative	16.9%
Use weighted average cost of capital based upon book value weights	16.4%
Use a weighted average cost of capital based upon target capital structure weights	41.8%
Use a weighted average cost of capital based upon current market value weights	28.8%
Use a weighted average cost of capital based upon some other weighting scheme	0.6%

(Source; Gitman and Mercurio, Op cit.)

These data, provided by Dr. Vander Weide, himself, in another UNE proceeding indicate that book value weights are used by financial managers, and are listed by approximately 16% of those surveyed. The data also show that only about 29% of the financial managers surveyed specifically identified using market value weights to calculate overall capital costs for capital budgeting purposes.

Dr. Vander Weide's testimony in this proceeding implies that market value capital structures are the only measure of capital ratios that financial executives could or would possibly consider for capital budgeting purposes, and that he is aware of no evidence to the contrary. However, the data he provides to support his claims indicates that such is not the case. In fact, more than 70% of the respondents to the survey provided by Dr. Vander Weide listed some measure of capital ratios other than market value weights. The Company witness' own authority for relying on market value capital structures indicates that both book and market values are considered by financial managers for capital budgeting—and that Dr. Vander Weide is aware of that fact. Those data offer additional support for the position that a range of overall returns should be determined using both book value and market value capital structures.

Q. DO YOU BELIEVE THE COMMISSION SHOULD UTILIZE THE COMPANY'S REQUESTED MARKET-BASED CAPITAL STRUCTURE FOR RATEMAKING PURPOSES IN THIS PROCEEDING?

A. No, I do not. I recommend that both a market-based capital structure and a book value-based capital structure be used for calculating a reasonable range of overall long-run incremental capital costs in this proceeding. I agree with Company witness Vander Weide that there is theoretical support for the use of a market-based capital structure in a capital budgeting decision process. However, there are many reasons, which I have detailed above, why that theoretical construct does not necessarily apply in this situation. The Company's position that the only capital structure which can be considered in this proceeding is a market-based capitalization is, I believe, flawed. A more reasonable approach is to consider both market-based and book value-based capital structures to develop a range of overall long-run incremental capital costs, with the market-based capital structure establishing the upper bound of that range and the book value-based capitalization establishing the lower bound.

Q. WHAT IS VERIZON-NH's RECENT BOOK VALUE CAPITALIZATION?

A. Schedule 2, page 3 shows that, using year-end 2000, 2001 and June 30 and September 30, 2002 reported capital structures for Verizon New England, Verizon-NH's booked capital structure has averaged approximately 45% common equity and 55% total debt. It is worth noting that Verizon-NH's common equity ratio in the most recent quarter has declined to approximately 38.6% of total capital.

Q. HOW DOES THAT CAPITAL STRUCTURE COMPARE WITH THE TELEPHONE INDUSTRY ON AVERAGE?

A. Schedule 2, page 4 shows that the average common equity ratio for the large telecommunications companies averages 44% according to C.A. Turner's Utility Reports for November 2002. The average common equity ratio of the companies used to estimate and upper bound of the cost of equity for local exchange telephone companies (Bell South, Century Telephone, SBC Corp,. and Verizon) is 43% of total capital. Page 4 of that Schedule also shows that for small telecom companies, the average common equity ratio is 52% of total capital.

Q. HOW DOES VERIZON'S BOOK VALUE CAPITAL STRUCTURE COMPARE WITH THE CAPITALIZATION OF ENERGY UTILITIES TODAY?

A. Verizon-NH's actual average capital structure is similar to that for the gas distribution industry and contains more equity and less debt that that of the electric utility industry. Page 5 of Schedule 2 shows that the recent average common equity ratio of the gas industry (distribution and integrated companies) is approximately 41% to 42% of total capital. For gas distribution utilities, the average common equity ratio is 45% of total capital—the same equity ratio as utilized by Verizon-NH over the past two years.

Page 6 of Schedule 2 shows that the current average common equity ratio of the electric utility industry is 37% of total capital. These data indicate that electric utility operations carry lower risk than gas or local exchange telephone operations and that electric utility operations can be capitalized with less equity and more debt than gas distribution or telephone operations.

Q. WHAT IS YOUR RECOMMENDATION THEN, WITH REGARD TO THE CAPITAL STRUCTURE THAT SHOULD BE USED IN DETERMINING THE LONG-RUN INCREMENTAL CAPITAL COSTS TO BE USED IN THIS PROCEEDING?

A. For the book value capital structure, I will use 45% common equity and 55% debt. That capital structure is similar to the manner in which V-NH has actually been capitalized over the past couple of years and is similar to the manner in which the telephone industry is capitalized, generally.

The market-based capital structure for the three remaining RHCs and Century Telephone, shown on page 7 of Schedule 2, is derived simply by multiplying the market price of each company by the number of shares outstanding. The market value of each company's debt is assumed to be equal to the book value of debt reported by Value Line in its October 4, 2002 report on each company. The current market-based capital structure of the telecom holding companies which contain significant local exchange operations, then, is 63.41% common equity and 36.95% total debt. For the purposes of establishing a reasonable forward-looking ratemaking capital structure for UNE's, I will use a market-based capitalization consisting of 65% common equity and 35% debt. I recommend that the Commission use both the current book value capital structure ratios and the current market-value capitalization for the telecommunications companies in determining an overall long-run incremental cost of capital for Verizon-NH in this proceeding.

Q. WHAT VALUE DID YOU USE FOR THE MARGINAL COST OF DEBT?

A. With regard to the marginal cost of debt capital, Dr. Vander Weide uses a April 2002 yield for "A"-rated corporate bonds of 7.40%. The average daily yield over the most recent six-week period for "A"-rated utility debt is 6.79%[7]. For forward-looking costing purposes the more recent bond yield is preferable.

However, it is important to note that this debt cost estimate is conservative (i.e., high) because, it considers only long-term debt costs even though a substantial portion of the telecommunications companies' total debt is short-term debt. If a short-term debt cost rate were included as a portion of the marginal debt cost, the marginal debt cost rate would be lower. The two capital structures (market and book), which will be used to develop a range of overall returns for the Company, along with the current incremental cost of debt, 6.79%, are shown on page 8 of Schedule 2.

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[7] Value Line *Selection & Opinion* (9/20/02 - 10/25/02).

Q. IF VERIZON WERE INVOLVED IN A NORMAL RATE BASE/RATE OF RETURN PROCEEDING, WOULD YOUR CAPITAL STRUCTURE RECOMMENDATION BE THE SAME AS IT IS HERE?

A. No. In a traditional rate case setting, there is no need to consider a market-based capital structure. For a traditional rate proceeding the only capital structure which should be considered is the Company's book value capital structure. As I noted above Verizon-New Hampshire has been capitalized over the past couple of years with approximately 45% common equity and 55% total debt. In addition, that capital structure is similar to the manner in which the large telecommunications companies are currently capitalized, generally. Therefore, were this a traditional rate proceeding, I believe a capital structure consisting of 45% common equity and 55% debt would provide a reasonable basis for setting local exchange telephone rates for Verizon in New Hampshire.

With regard to the cost rate of debt, the Company reports in response to Staff Data Request 1-2, that its embedded cost of debt at June 30, 2002 was 7.051%. That cost of debt, in combination with the 45% common equity/55% debt capital structure and the cost of equity of a local exchange telephone operation (derived in the next section of this testimony) would provide an appropriate overall return for V-NH in a traditional rate proceeding.

Q. DOES THIS CONCLUDE YOUR DISCUSSION OF CAPITAL STRUCTURE ISSUES?

A. Yes, it does.

III. METHODS OF EQUITY COST EVALUATION

A. DISCOUNTED CASH FLOW MODEL

Q. PLEASE DESCRIBE THE DISCOUNTED CASH FLOW (DCF) MODEL YOU USED TO ARRIVE AT AN ESTIMATE OF THE COST RATE OF COMMON EQUITY CAPITAL FOR THE COMPANY IN THIS PROCEEDING.

A. The DCF model relies on the equivalence of the market price of the stock (P) with the present value of the cash flows investors expect from the stock, providing the discount rate equals the cost of capital. The total return to the investor, which equals the required return according to this theory, is the sum of the dividend yield and the expected growth rate in the dividend.

The theory is represented by the equation,

$$k = D/P + g, \qquad (1)$$

where “k” is the equity capitalization rate (cost of equity, required return), “D/P” is the dividend yield (dividend divided by the stock price) and “g” is the expected sustainable growth rate.

Q. WHAT GROWTH RATE (g) DID YOU ADOPT IN DEVELOPING YOUR DCF COST OF COMMON EQUITY FOR THE GAS UTILITIES?

A. The growth rate variable in the traditional DCF model is quantified theoretically as the dividend growth rate investors expect to continue into the indefinite future. The DCF model is actually derived by 1) considering the dividend a growing perpetuity, that is, a payment to the stockholder which grows at a constant rate indefinitely, and 2) calculating the present value (the current stock price) of that perpetuity. The model also assumes that the company whose equity cost is to be measured exists in a steady state environment, i.e., the payout ratio and the expected return are constant and the earnings, dividends, book value and stock price all grow at the same rate, forever. As with all mathematical models of real-world phenomena, the DCF theory does not exactly “track” reality. Payout ratios and expected equity returns do change over time. Therefore, in order to properly apply the DCF model to any real-world situation and, in this case, to find the long-term sustainable growth rate called for in the DCF theory, it is essential to understand the determinants of long-run expected dividend growth.

Q. CAN YOU PROVIDE AN EXAMPLE TO ILLUSTRATE THE DETERMINANTS OF LONG-RUN EXPECTED DIVIDEND GROWTH?

A. Yes, in Appendix B, I provide an example of the determinants of a sustainable growth rate on which to base a reliable DCF estimate. In addition, in Appendix B, I show how reliance on earnings or dividend growth rates alone, absent an examination of the underlying determinants of long-run dividend growth, can produce inaccurate DCF results.

Q. DID YOU USE A SUSTAINABLE GROWTH RATE APPROACH TO DEVELOP AN ESTIMATE OF THE EXPECTED GROWTH RATE FOR THE DCF MODEL?

A. Yes. The objective of this proceeding is to determine the return appropriate for determining the cost of Verizon's unbundled network elements in New Hampshire. One important part of that determination is an estimate of the cost of equity capital to the company. Direct market data regarding V-NH's equity capital is not available. Therefore, I have calculated both the historical and projected sustainable growth rate for a sample of telecommunications firms with sizeable local exchange operations. That sample of companies is comprised of the three remaining former Bell Regional Holding Companies (RHCs) and Century Telephone. All of those companies realize at least 60% of their revenues from local exchange operations and are followed by Value Line.

In addition, and in order to more accurately assess the equity capital cost rate of V-NH's local exchange operations, I have estimated the equity capital cost a sample of property/casualty insurance companies as well as a sample group of natural gas distribution companies. To supplement the sustainable growth rate analysis, I have also analyzed published data regarding both historical and projected growth rates in earnings, dividends, and book value for all the companies under study.

Q. WHY HAVE YOU USED THE TECHNIQUE OF ANALYZING THE MARKET DATA OF SEVERAL COMPANIES?

A. I have used the "similar sample group" approach to cost of capital analysis because it yields a more accurate determination of the cost of equity capital than does the analysis of the data of one individual company. Any form of analysis, in which the result is an estimate, such as growth in the DCF model, is subject to measurement error, i.e., error induced by the measurement of a particular parameter or by variations in the estimate of the technique chosen. When the technique is applied to only one observation (e.g., estimating the DCF growth rate for a single company) the estimate is referred to, statistically, as having "zero degrees of freedom." This means, simply, that there is no way of knowing if any observed change in the growth rate estimate is due to measurement error or to an actual change in the cost of capital. The degrees of freedom can be increased and exposure to measurement error reduced by applying any given estimation technique to a sample of companies rather than one single company. Therefore, by analyzing a group of firms with similar characteristics, the estimated value (the growth rate and the resultant cost of capital) is more likely to equal the "true" value for that type of operation.

Q. WHY WERE THE REMAINING RHCs AND CENTURY TELEPHONE SELECTED FOR YOUR ANALYSIS OF THE COST OF EQUITY CAPITAL OF VERIZON'S LOCAL EXCHANGE OPERATIONS?

A. Although there are significant changes occurring in the telecommunications industry that make the former-Bell RHCs and Century more risky and their equity costs higher than local exchange telephone operations such as Verizon-NH, I believe an equity cost analysis of those firms can offer useful information in estimating the equity capital cost of a telephone utility operation. Of course, the RHCs and Century have stepped up diversification efforts and local exchange operations now a smaller portion of all revenues collected by those companies. That significant diversification into unregulated, competitive operations has increased the investment risk of those firms and the concomitant higher return expectation is impounded in their stock prices and investor-expected returns.

Therefore, while local exchange operations remain an important profit center for those firms and, as a result, their market data provide some indication of the cost of equity of that type of firm, those companies also have invested in riskier operations which will raise the market required return above that of a local exchange telephone company. For those reasons, the market-based equity cost of the telecommunications holding companies should be considered to provide an indication of the upper end of a reasonable range of equity capital costs for V-NH's local exchange operations.

Q. IS THERE OBJECTIVE EVIDENCE THAT LOCAL EXCHANGE OPERATIONS CARRY LOWER INVESTMENT RISK THAN, SAY, WIRELESS OR LONG-DISTANCE OPERATIONS?

A. Yes, such objective evidence has been offered to the investment community by Verizon's corporate predecessors. The risk differential between local telephone operations and other telecommunications operations was explicitly recognized in the process of valuation undertaken in the creation of Verizon out to the merger between NYNEX and Bell Atlantic. One of the methods used by the analysts in reaching an estimate of the appropriate exchange ratio (i.e., in the merger how many shares of NYNEX stock should be exchanged for a share of Bell Atlantic) was a discounted cash flow analysis. The Company's (Bell Atlantic, now Verizon) analysts (Merrill Lynch) used different discount rates to value the different portions of the Company's business, assigning the lowest discount rate—signifying the lowest investment risk—to local exchange telephone operations:

> "Merrill Lynch calculated a range of implied NYNEX/Bell Atlantic exchange ratios, based on the implied per share values for NYNEX and Bell Atlantic resulting from the discounted cash flow analysis described in this paragraph (the "Discounted Cash Flow Analysis"). Such implied per share values were based on estimates, prepared by management of Bell Atlantic in connection with the Merger and the Merrill Lynch analyses, of after-tax, unlevered free cash flow for each major business segment of NYNEX and Bell Atlantic for the years 1996 through 2005 and the following ranges of discount rates and ranges of 2005 exit

> multiples applied to such business segments: (a) for the Telco Business, a range of exit multiples from 4x to 5x and a range of discount rates from 8% to 10%; (b) for the long distance telephone business, a range of exit multiples from 4x to 6x and a range of discount rates from 10% to 12%; and (c) for the cellular telephone business, a range of exit multiples from 9x to 11x and a range of discount rates from 10% to 14%." (Bell Atlantic Corporation, SEC Form S-4, September 6, 1996, p. 47)

It is clear from this analysis, undertaken by the Company (Verizon/Bell Atlantic) and its financial agents, that the local exchange telephone business is considered to be the least risky enterprise in which the Company is engaged. The discounted cash flow valuations which were used to set the market price for the merger looked forward to 2005 and assigned a lower discount rate to the local exchange "Telco operations," and a higher discount rate to wireless and long-distance operations. Therefore, the Company and its investment bankers have recognized that LEC operations carry less risk than telecommunications companies as a whole.

This evidence confirms the use of the cost of capital for telecommunications holding companies as an upper bound for the cost of equity of a local exchange telephone operation. The telecommunications companies included in my equity capital cost rate analysis are: Bell South Corporation (BLS), SBC Communications (SBC), Verizon Communications (VZ) and Century Telephone (CTL). [Note: The stock ticker symbols are referenced here because that is the manner in which the companies are identified in Exhibit_(SGH-1).]

Q. YOU INDICATED THAT YOU HAVE ALSO ANALYZED THE MARKET DATA OF A SAMPLE OF PROPERTY/CASUALTY INSURANCE COMPANIES. PLEASE EXPLAIN WHY THAT MARKET INFORMATION IS USEFUL IN INDICATING A PROPER EQUITY COST RANGE FOR A LOCAL EXCHANGE TELEPHONE OPERATION.

A. As I noted above, there is no direct market-based, or "pure-play" proxy for local exchange telephone operating companies. The telecommunications firms I have selected have the advantage of actually having some local exchange operations as part of their business mix—that fact makes them a reasonable proxy in our task of isolating the cost of equity of that type of operation. However, those companies are expanding rapidly into other, riskier endeavors are consolidating operations and have recently been plagued by substantial over-capacity problems. In my view, those facts make the cost of equity result based on the market data of those firms a less robust indicator of the upper limit of the cost of equity of local exchange telecommunications operation like Verizon-New Hampshire. For that reason, I have elected to also analyze the cost of equity of a group of property/casualty insurance companies followed by Value Line.

My inclusion of property/casualty insurance companies in my analysis in this proceeding is designed to provide a more reliable upper bound to the cost of equity range appropriate for a local exchange telephone operation. The insurance industry is highly competitive. It is a relatively simple process to change one's insurance provider, and no one firm has a franchise operation in any locale or is a provider through which other insurance must be accessed (like local exchange service). The use of insurance firms as a determinant of the upper end of a range of equity cost, then, recognizes the potential for eventual competition (and the cost of equity which results from that situation) in the local exchange business. However, in some states insurance companies are rate-regulated. While the regulation is not as detailed as is utility regulation, it is similar, and that aspect adds to the usefulness of these companies as proxies to establish the upper-end of a reasonable range of equity capital costs for local exchange operations.

In selecting a sample of insurance firms to analyze, I screened all the property and casualty and diversified insurance firms followed by Value Line. I selected companies that had a continuous financial history (i.e., currently paying a dividend, and had no dividend reductions or erratic earnings over, at least, the most recent five years) and had revenues generated by private property insurance. The data for the sample group regarding the writing of automobile insurance (fire, homeowners, farmowners and allied lines) were obtained from Best's Aggregates and Averages, 2002 edition[8].

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[8] Best's Aggregates and Averages is a widely-utilized source for current and historical data on the property/casualty insurance industry.

The companies included in the sample group are Allmerica Financial (AFC), Allstate Corp. (ALL), W. R. Berkley Corp. (BKLY), Chubb Corporation (CB), Cincinnati Financial Corp. (CINF), Mercury General (MCY), Old Republic International (ORI), PartnerRe Ltd. (PRE), Progressive Corporation (PGR), SAFECO Corporation (SAFC), St. Paul Companies (SPC), Selective Insurance Group, Inc. (SIGI), Transatlantic Holdings (TRH), 21st Century Insurance (TW), and XL Capital Ltd. (XL).

Q. HAS COMPANY WITNESS VANDER WEIDE OFFERED EVIDENCE IN PRIOR REGULATORY PROCEEDINGS THAT INSURANCE COMPANIES COULD BE A REASONABLE PROXY FOR DETERMINING THE EQUITY CAPITAL COST OF TELECOMMUNICATIONS FIRMS?

A. Yes. Dr. Vander Weide and I recently testified in an automobile insurance rate proceeding before the Commissioner of Insurance in North Carolina (N.C. Department of Insurance, Docket No. 1073). In his cost of capital testimony in that proceeding, Dr. Vander Weide used the S&P Industrials as a proxy group to estimate the cost of equity of insurance companies. In his testimony in the instant proceeding, Dr. Vander Weide uses the S&P Industrials as a proxy for the cost of equity of telecommunications companies.

Therefore, Dr. Vander Weide has testified that the equity risk of telecommunications firms is equal to that of the S&P industrials and the equity risk of insurance companies is also equal to that of the S&P industrials. In simple logical terms the syllogism goes as follows: if A=C, and B=C; then A=B. The evidence provided by Dr. Vander Weide in recent regulatory proceedings confirms that the cost of equity capital appropriate for insurance companies is a reasonable proxy for the cost of equity capital of telecommunications companies.

Q. YOU INDICATED THAT YOU HAVE ALSO ANALYZED THE MARKET DATA OF A SAMPLE OF GAS DISTRIBUTION COMPANIES. PLEASE EXPLAIN WHY THAT MARKET INFORMATION IS USEFUL IN INDICATING A PROPER EQUITY COST RANGE FOR A LOCAL EXCHANGE TELEPHONE OPERATION.

A. As I noted above, the telecommunications and insurance firms studied in my analysis carry higher investment risk that a local exchange telephone operation like V-NH, due to their competitive operations. Therefore, an analysis of the market data of those firms will provide a cost of equity capital estimate that is greater than that appropriate for a local exchange telephone operation.

In order to balance the analysis, it is necessary to also analyze a group of companies that are somewhat similar in risk to local exchange telephone operations, but have somewhat *lower* overall risk. Natural gas distribution operations fulfill that requirement. By estimating the cost of equity of all three sample groups, the cost of equity capital for a local exchange telephone utility operation can be more accurately estimated, being bracketed above by the equity capital cost of the telecommunications holding companies and insurance firms and below by the equity capital cost of gas distributors.

While gas distribution operations are generally considered to carry less investment risk than telephone operations, there are many similarities between the local exchange telephone industry and the gas distribution industry. Like the telephone industry, the gas industry underwent massive structural changes in the 1980s. Due to regulatory changes at the Federal level and pressures in the marketplace, the gas utility system in the U.S. was split into a transportation industry and a distribution industry. In broad terms, that bifurcation of the gas industry was similar to the separation of the telephone industry into long distance and local exchange operations. In addition, gas distributors have faced the “bypass” problem that telephone company representatives have, for years, touted as a major risk to the security of their income stream. Gas distributors are bypassed due to the ability of pipelines to supply gas directly to customers, as well as the ability of customers in some portions of the U.S. to purchase gas supplies directly from producers or other marketers, or in gas-rich areas of the country, to drill their own wells. Finally, the operational risk of the marketing function (securing a reliable supply of gas for a particular customer base), which was once borne solely by the pipelines, has been shifted forward to the distributors. Gas distribution operations, then, face some operational risks that are similar to local exchange telephone operations, and market-based indicators of capital costs for gas distributors are useful in identifying the lower end of the range of appropriate capital costs for local exchange telephone operations.

In selecting a sample of gas distribution firms to analyze, I screened all the gas distribution firms followed by Value Line. I selected companies from that group that had a continuous financial history and had at least 90% of operating revenues generated by gas distribution operations. In addition, I eliminated companies that were in the process of merging or being acquired and had realized an upward stock price shift due to that activity or companies that had omitted dividends. The data for the sample group regarding the percent of revenues generated by gas distribution operations were obtained from Edward Jones Natural Gas Industry Summary, September 30, 2002 edition, the Value Line Investment Survey, *Ratings and Reports*, September 20, 2002 and C.A. Turner's Utility Reports, November, 2002.

The companies included in the similar-risk sample group in this proceeding are AGL Resources (ATG), Atmos Energy Corporation (ATO), Cascade Natural Gas Corporation (CGC), Laclede Group (LG), New Jersey Resources (NJR), Northwest Natural Gas (NWNG), Peoples Energy Corp. (PGL), Piedmont Natural Gas Company (PNY), South Jersey Industries (SJI), and WGL Holdings (WGL).

Q. REGARDING YOUR USE OF GAS DISTRIBUTORS AS A LOWER-RISK PROXY FOR LOCAL EXCHANGE TELECOMMUNICATIONS, IS THERE ADDITIONAL EVIDENCE IN THIS PROCEEDING THAT SUPPORTS YOUR USE OF THOSE COMPANIES AS A PROXY FOR LOCAL EXCHANGE TELEPHONE OPERATIONS?

A. Yes, Schedule 3 attached to this testimony shows access line data obtained from the Company's annual ARMIS reports filed with the Federal Communications Commission. Those data show that while the number of the Company's residential and business access lines has moderated slightly in the past couple of years, the total number of access lines (residential, business and special) has continued to increase at a stable pace.

Page 1 of Schedule 3 provides a graphical representation of the number of access lines classified as residential, business and special access for the Company from 1991 through 2001. That graph shows that the number of access lines for residential and business service has declined by about 2% and 7%, respectively, since 1999; but the number of access lines for both types of service in 2001 is greater than it was in 1998. That graph also shows that the number of access lines attributed to special access has increased 115% over the past two years. As a result, as shown in the graph on page 2 of Schedule 3, the total number of access lines for Verizon-New Hampshire (the topmost line depicted in the graph) has increased steadily over the past ten years.

In sum, these data do not support the Company's claim that its operating risk has increased markedly due to the amount of competition in New Hampshire. The data do indicate that there has been some reduction in the number of access lines over the past couple of years, indicating that there is some competition, but that reduction is relatively small. Moreover, the overall trend in the total number of access lines sold by the Company continues to show a steady, upward trends during a period in which the Company implies that it is exposed to significant competition. The data that I have reviewed indicate that V-NH continues to operate in an environment that, while no longer fully monopolistic, certainly imparts less risk than one which is fully competitive. For that reason, it is clear that 1) the operating risk of V-NH is well below that of the telecommunications holding companies or any fully-competitive firm, and 2) gas distribution utility operations offer a reasonable proxy for the determination of the lower end of a reasonable range of equity capital cost for this Company.

Q. HOW HAVE YOU CALCULATED THE DCF GROWTH RATES FOR THE SAMPLE OF COMPARABLE COMPANIES?

A. Schedule 4, pages 1 through 11, shows the retention ratios, equity returns, sustainable growth rates, book values per share and number of shares outstanding for the comparable companies for the past five years for each of the utilities under study. Also included in the information presented in Schedule 4, are Value Line's projected 2002, 2003 and 2005-2007 values for equity return, retention ratio, book value growth rates and number of shares outstanding.

In evaluating these data, I first calculate the five-year average sustainable growth rate, which is the product of the earned return on equity (r) and the ratio of earnings retained within the firm (b). For example, Schedule 4, page 3, shows that the five-year average sustainable growth rate for Piedmont Natural Gas (PNY) is 3.72%. The simple five-year average sustainable growth value is used as a benchmark against which I measure the company's most recent growth rate trends. Recent growth rate trends are more investor-influencing than are simple historical averages.

Continuing to focus on PNY, we see that sustainable growth in 1997 and 1998 averaged about 4.5%—well above the average growth for the five-year period. Also, Value Line reports that sustainable growth in the most recent years, 2000 and 2001 averaged just above 3%, which was below historical average growth. By the 2005-2007 period, Value Line projects PNY's sustainable growth will rebound to a level about 50 basis points above the recent five-year average—about 4.3%. These data would indicate that investors expect PNY to grow at a rate in the future slightly above the growth rate that has existed, on average, over the past five years.

At this point I should note that, while the five-year projections are given consideration in estimating a proper growth rate because they are available to and are used by investors, they are not given sole consideration. Without reviewing all the data available to investors, both projected and historic, sole reliance on projected information may be misleading. Value Line readily acknowledges to its subscribers the subjectivity necessarily present in estimates of the future:

> "We have greater confidence in our year-ahead ranking system, which is based on proven price and earnings momentum, than in 3- to 5-year projections." (Value Line Investment Survey, Selection and Opinion, June 7, 1991, p.854).

Another factor to consider is that PNY's book value growth is expected to remain stable, increasing at a 6% rate over the next five years, after increasing at a 6% rate historically. Also, as shown on Schedule 5, page 2, PNY's dividend growth rate, which was 6% historically, is expected to decline to 4% in the future—slightly less than the sustainable growth rate projections. That information would tend to confirm investor expectations regarding sustainable growth in the future. Earnings growth rate data available from Value Line indicate that investors can expect a slightly higher growth rate in the future (6.5%) than has existed over the past five years (5.5%). However, Zack's (an investor advisory service that polls institutional analysts for growth earnings rate projections) projects a slightly lower earnings growth rate for PNY—4.5%—over the next five years.

PNY's projected sustainable growth, as well as Value Line's projected earnings growth indicates that investors can expect higher growth than has occurred, on average, in the past. Those projections are moderated by an expectation of dividend growth and sustainable growth below the level of earnings growth projections. A long-term sustainable growth rate of 5.0% is a reasonable expectation for PNY.

Q. IS THE INTERNAL (b x r) GROWTH RATE THE FINAL GROWTH RATE YOU USE IN YOUR DCF ANALYSIS?

A. No. An investor's sustainable growth rate analysis does not end upon the determination of an internal growth rate from earnings retention. Investor expectations regarding growth from external sources (sales of stock) must also be considered and examined. For PNY, page 7 of Schedule 4 shows that the number of outstanding shares increased at about a 1.8% rate over the most recent five-year period. Value Line expects the number of shares outstanding to increase more slowly through the 2005-2007 period, bringing the share growth rate down to about a 1.5% rate by that time. An expectation of share growth of 1.7% is reasonable for this company.

Because a goal of regulation, in duplicating the strictures of the competitive marketplace, is to allow a utility to recover no more than its cost of capital, it is reasonable to assume that the market price/book value ratio would have a tendency toward unity. However, the market price/book value ratio is unlikely to reach 1.0 overnight and, on average, utilities will continue to issue stock at prices above book value. In addition, Professor Myron Gordon, often referenced as the "father" of DCF in regulation, indicates that the DCF will overstate the cost of common equity capital when allowed returns exceed the cost of capital (i.e., when market prices are substantially above book value as they are currently)[9]. Given the current relationship between market prices and book value of the companies under study, Gordon indicates that the DCF would overstate the cost of common equity. Finally, although I have selected gas distribution firms for analysis which derive the majority of their revenues from utility operations, those firms are not "pure play" utilities—they do have some other operations. Those other operations, therefore, are likely to have an upward impact on the market price and the market-to-book ratio of those companies.

I believe, therefore, that a reasonable estimate of investors' expectations for utility price/book ratios is that it will range between current levels and 1.0. I have used the average as an estimate of investors' expectations for the future. Referring again to our example gas utility, PNY, at the time of this analysis, that firm's market price is 181% of its year-end book value (M/B = 1.81). The result of combining expected internal (b x r = 5.00%) and external growth rates (1.7%) yields an investor-expected long-term growth rate of 5.68% (see Exhibit__(SGH-1), Schedule 5, page 1 of 6).

I have included the details of my growth rate analyses for PNY as an example of the methodology I use in determining the DCF growth rate for each company in the utility sample groups. A description of the growth rate analyses of each of the companies included in my sample groups is set out in Appendix C. Schedule 5, page 1, of Exhibit_(SGH-1) attached to this testimony shows the internal, external and resultant overall growth rates for the gas distribution utility companies analyzed, while pages 3 and 5 of Schedule 5 show the growth rate calculations for the telecommunications and insurance company groups, respectively.

Q. HAVE YOU CHECKED THE REASONABLENESS OF YOUR GROWTH RATE ESTIMATES AGAINST OTHER, PUBLICLY AVAILABLE, GROWTH RATE DATA?

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[9] Gordon, M.J., The Cost of Capital to a Public Utility, MSU Public Utilities Studies, East Lansing, Michigan, 1974, pp. 9, 10.

A. Yes. Pages 2, 4 and 6 of Schedule 5 shows the results of my DCF sustainable growth rate analysis and compares those estimates to the following: 5-year historic and projected earnings, dividends and book value growth rates from Value Line, earnings growth rate projections from Zack's, the average of Value Line and Zack's growth rates and the 5-year historical compound growth rates for earnings, dividends and book value for each company under study.

• Gas Distribution Utilities - My DCF growth rate estimate for all the distribution companies included in my analysis is 5.40%. This figure is higher than Value Line's projected average growth rate in earnings, dividends and book value for those same companies (5.07%) and is well above the five-year historical average earnings, dividend and book value growth rate reported by Value Line for those companies (3.40%). My growth rate estimate for the companies under review is slightly lower than Zack's earnings growth projection for those companies, 6.57%; but is well above the projected average dividend growth rate of the sample companies, 1.85%. The growth rate projections published by investor services confirm the reasonableness of my growth rate estimate for the sample of gas utilities.

• Telecommunications Companies - My DCF growth rate estimate for all the telecommunications holding companies included in my analysis is 8.71%. This figure is higher than Value Line's projected average growth rate in earnings, dividends and book value for those same companies (7.25%) and is also above the five-year historical average earnings, dividend and book value growth rate reported by Value Line for those companies (8.00%). My growth rate estimate for the companies under review is also higher than Zack's earnings growth projection for those companies, 7.48%; and is well above the projected average dividend growth rate of the sample companies, 4.88%. The published data indicate that my DCF growth rate estimate for the telecommunications companies may be conservative (i.e., too high).

• Insurance Companies - My DCF growth rate estimate for all the insurance companies included in my analysis is 9.75%. This figure is lower than Value Line's projected average growth rate in earnings, dividends and book value for those same companies (10.49%), which is somewhat exaggerated due to very high earnings growth projections for some of those companies. My DCF growth rate estimate for the insurance companies is well above the five-year historical average earnings, dividend and book value growth rate reported by Value Line for those companies (6.73%). My growth rate estimate for the companies under review is lower than Zack's earnings growth projection for those companies, 11.62%; but considerably above the projected average dividend growth rate of the sample companies, 4.67%.

Q. DOES THIS CONCLUDE THE GROWTH RATE PORTION OF YOUR DCF ANALYSIS?

A. Yes, it does.

Q. HOW HAVE YOU CALCULATED THE DIVIDEND YIELDS?

A. I have estimated the next quarterly dividend payment of each firm analyzed and annualized them for use in determining the dividend yield. If the quarterly dividend of any company were expected to be raised in the next quarter (4th quarter 2002 or 1st quarter of 2003), I increased the current quarterly dividend by (1+g). A dividend adjustment was required for the following companies in the sample groups: Atmos Energy, New Jersey Resources, and Northwest Natural Gas.

The next quarter annualized dividends were divided by a recent daily closing average stock price to obtain the DCF dividend yields. I use the most recent six-week period to determine an average stock price in a DCF cost of equity determination because I believe that period of time is long enough to avoid daily fluctuations and recent enough so that the stock price captured during the study period is representative of current investor expectations.

Schedule 6 contains the market prices, annualized dividends and dividend yields of the utility companies under study. Page 1 of Schedule 6 indicates that the average dividend yield of the gas distribution utilities under study is 5.06%. The average year-ahead dividend projected by Value Line for those same companies is about 6 basis points higher, or 5.12%.

Schedule 6, page 2, indicates that the average dividend yield for the sample group of telecommunications companies is 3.54%. That dividend yield is about 20 basis points higher than Value Line's projected year-ahead dividend yield for those companies, 3.35%. For the insurance companies under study, the average dividend yield shown on page 3 of Schedule 6 is 2.17%, roughly equivalent to Value Line's projected year-ahead dividend yield for those companies—2.18%.

Q. IN DERIVING THE DIVIDEND YIELDS PRESENTED IN YOUR SCHEDULE 6, DID YOU ADJUST THE DIVIDEND YIELD TO ACCOUNT FOR QUARTERLY COMPOUNDING OF THE DIVIDEND?

A. No. Such an adjustment results from an improper interpretation of the theory on which the DCF model is based and serves only to inflate a DCF-determined equity capital cost estimate. The DCF model may be derived under two alternative mathematical assumptions: discrete compounding and continuous compounding. Under the assumption of continuous compounding, the dividend is paid continuously and the DCF model takes on the following exponential form[10]:

$$P_0 = \int_0^{\infty} D_t e^{-kt} \, dt. \qquad (2)$$

Carrying out the integration indicated above, the resulting DCF model may be written as:

$$k = D_0/P_0 + g. \qquad (3)$$

The dividend variable is defined as "D_t = dividend per share paid by the corporation *during* t" and the price variable is defined as "P_t = the price of a corporation's share of stock *at the end* of period t" (Gordon, p. 44, emphasis added). Therefore, under the continuous compounding assumption, the resultant DCF model indicates that the cost of equity capital, "k", equals the dividend paid during the preceding period divided by the current stock price, plus expected growth. For example, if the dividend were paid continuously and the proper “period” was one year, the dividend yield portion of the DCF model would be determined by dividing the current stock price into the dividend yield paid out during the immediately preceding year. In other words, it would be last year’s dividend divided by the current stock price.

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[10] Gordon, M.J., The Investment, Financing, and Valuation of the Corporation, R.D. Irwin, Inc., Homewood, Ill., 1962, p.45.

In actuality, dividends are not paid continuously but in a discrete, usually quarterly, fashion. When the DCF is derived under these assumptions, the result is:

$$k = D_1/P_0 + g. \qquad (4)$$

Some analysts automatically (and mistakenly) assume that the relevant “period” for the above DCF model is one year and proceed to “adjust” the quarterly dividend to account for one year’s growth. Dr. Gordon, in his own testimony before Federal regulators has argued against such treatment:

> “D_1 is the forecast dividend for the coming year if dividends are paid annually. Common practice , however, is to pay dividends quarterly, in which case D_t in [the following equation], the fundamental expression for share price, is a quarterly dividend.
>
> $$P_0 = \frac{D_1}{(1+k)} + \ldots + \frac{D_t}{(1+k)^t} + \ldots + \frac{D_\infty}{(1+k)^\infty}$$
>
> Because it is customary and convenient to think in terms of annual and not quarterly figures for rate of return and growth statistics, annualized figures will be used here. Annualized figures are simply four times quarterly figures. ...Hence, in arriving at the cost of equity capital, the correct figure for the dividend yield term in Eq.[7] is the annualized value of the forecast dividend for the coming quarter divided by the current price.” (Testimony of M.J. Gordon, F.C.C. Docket No. 79-63, pp. 63–64)

Additionally, as Dr. Gordon noted in his text, The Cost of Capital to a Public Utility (Ibid., p. 81),

> “[S]ince dividends are paid quarterly, the relevant difference [between D_0 and D_1] is in the quarterly dividend.”

Therefore, the DCF model is a quarterly model not an annual model because the dividends are paid quarterly rather than annually. The proper dividend yield to use in the DCF model is based on the expected next quarter dividend, annualized, as I have done and as Dr. Gordon has done in his equity capital cost testimony before other Federal regulators. The DCF model, then, implicitly recognizes the quarterly payment of dividends and does not require any “adjustment” to account for one year’s expected growth.

Q. WHAT IS YOUR COST OF EQUITY CAPITAL ESTIMATE FOR THE UTILITY COMPANIES, UTILIZING THE DCF MODEL?

A. Schedule 7 shows that the average DCF cost of equity capital for the group of gas distribution utilities studied is 10.46%. The DCF results for the telecom and insurance companies are 12.25% and 11.92%, respectively. These results indicate that the telecom and insurance companies are relatively similar in risk, and both have a risk level that exceeds that of gas distributors.

Q. DOES THIS CONCLUDE YOUR DCF ANALYSIS OF THE COST OF EQUITY CAPITAL FOR V-NH?

A. Yes, it does.

B. CAPITAL ASSET PRICING MODEL

Q. PLEASE DESCRIBE THE CAPITAL ASSET PRICING MODEL (CAPM) YOU USED TO ARRIVE AT AN ESTIMATE FOR THE COST RATE OF THE COMPANY’S EQUITY CAPITAL.

A. The CAPM states that the expected rate of return on a security is determined by a risk-free rate of return plus a risk premium which is proportional to the non-diversifiable (systematic) risk of a security. Systematic risk refers to the risk associated with movements in the macro-economy (the economic "system") and, thus, cannot be eliminated through diversification by holding a portfolio of securities. The beta coefficient (β) is a statistical measure which is an attempt to quantify the non-diversifiable risk of the return on a particular security against the returns inherent in general stock market fluctuations. The formula is expressed as follows:

$$k = r_f + \beta(r_m - r_f), \qquad (5)$$

where "k" is the cost of equity capital of an individual security, "r_f" is the risk-free rate of return, "β" is the beta coefficient, "r_m" is the average market return and "$r_m - r_f$" is the market risk premium. The CAPM is used in my analysis, not as a primary cost of equity analysis, but as a check of the DCF cost of equity estimate. Although I believe the CAPM can be useful in testing the reasonableness of a cost of capital estimate, certain theoretical shortcomings of this model (when applied in cost of capital analysis) reduce its usefulness.

Q. CAN YOU EXPLAIN WHY YOU APPLY THE CAPM ANALYSIS WITH CAUTION?

A. Yes. The reasons why the CAPM should be used in cost of capital analysis with caution (i.e., as a corroborative methodology, not as a primary determinant of the cost of capital) are detailed in Appendix D. It is important to understand that my caution with regard to the use of the CAPM in a cost of equity capital analysis does not indicate that the model is not a useful description of the capital markets. Rather, it recognizes that in the practical application of the CAPM to cost of capital analysis there are problems that cause the results of that type of analysis to be less reliable than other, more widely accepted models such as the DCF.

Q. WHAT VALUE HAVE YOU CHOSEN FOR A RISK-FREE RATE OF RETURN IN YOUR CAPM ANALYSIS?

A. As the CAPM is designed, the risk-free rate is that short-term rate of return investors can realize with certainty. The nearest analog in the investment spectrum is the 13-week U. S. Treasury Bill. Although longer-term Treasury bonds have equivalent default risk to T-Bills, those longer-term government securities carry maturity risk that the T-Bills do not have. When investors tie up their money for longer periods of time, as they do when purchasing a long-term Treasury, they must be compensated for future investment opportunities forgone as well as the potential for future changes in inflation. Investors are compensated for this increased investment risk by receiving a higher yield on T-Bonds.

As I noted in my previous discussion of the macro-economy, due to a sluggish economy, the Fed has acted vigorously over the past year to lower short-term interest rates. Over the most recent six-week period, T-Bills have produced an average yield of only 1.63% (data from Value Line *Selection & Opinion*, six most recent weekly editions[11]).

Q. DO YOU BELIEVE THE USE OF A LONG-TERM TREASURY BOND RATE IS APPROPRIATE IN THE CAPM?

A. No. Although the selection of a long- or short-term Treasury security as the risk free rate of return to be used in the CAPM is often one of the areas of contention in applying the model in cost of capital analysis, the use of a normalized short-term T-Bill rate is the more theoretically correct parameter. However, the T-Bill yield can be influenced by Federal Reserve policy, and, as noted above, the Fed's current stance regarding economic stimulation has caused the current level of T-Bills to fall to historic lows. Therefore, for purposes of analysis in this proceeding I will use both the T-Bill and long-term Treasury bond yields for the risk-free rate in the CAPM. Also, along with those measures of the risk-free rate I use the corresponding measures of market risk premiums.

Q. WHAT HAVE YOU CHOSEN AS THE MARKET RISK PREMIUM FOR THE CAPM ANALYSIS?

A. In their year-end 2002 edition of Stocks, Bonds, Bills and Inflation, R.G. Ibbotson

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[11] Current T-Bill yield, six-week average yield from Value Line Selection & Opinion (9/20/02-10/25/02).

Associates indicates that the average market risk premium between stocks and T-Bills over the 1926–2001 time period is 8.8% (based on an arithmetic average) and 6.9% (based on a geometric average). For long-term Treasuries, the market risk premiums are 7.0% (based on an arithmetic average) and 5.40% (based on a geometric average). I have used these values to estimate the market risk premium in the CAPM analysis. The geometric mean is based on compound returns over time and the arithmetic mean is based on the average of single-period returns.

Q. CAN YOU EXPLAIN THE DIFFERENCE BETWEEN ARITHMETIC AND GEOMETRIC MEANS IN COST OF CAPITAL ANALYSIS?

A. Yes. The geometric mean is based on compound returns over time and the arithmetic mean is based on an average of single-period returns. A numerical example will simplify the explanation. Suppose, for example, in a world of no inflation, an investor purchased for $50 a security which paid no dividend. During the first year after the purchase, the price of the security rises to $100 (a gain of 100%), but during the second year, the price falls back to $50 (a decrease of 50%).

A geometric (compound) average measure of the investors' return would divide the ending value by the beginning value ($50/$50 = 1) and take the *n*th root of that quotient. In this case there are two periods, so $n = 2$. Subtracting 1 from the result we find, what the investor knew intuitively, he made no money. He started out with $50, and wound up with $50. His investment had shown a return of 0% per year over the period.

Under arithmetic averaging, we find a 100% return in the first period ($50 rises to $100) and a -50% return in the second period ($100 falls to $50), for an arithmetic average return over the two periods of 25% (100%+(-50%)/2). It would be most difficult to convince our investor, with $50 in hand at the end of two years when $50 was invested at the beginning of that period, that the return over that period was 25%, according to an arithmetic average.

In addition, the arithmetic average of an historical return series assumes that the investment is bought and sold every period (without transaction costs or taxes) while the geometric average assumes that investors buy and hold their investments. While the monthly selling and re-buying of market indexes could characterize the investment behavior of a portion of the market, I believe it is unreasonable to assume that sort of investment pattern is apropos for all investors. In addition, the choice of the time interval in which the "market" is bought and sold influences the arithmetic result—the shorter the interval, the higher the result. Therefore, consideration of both the arithmetic and geometric averages provides a more rational approximation of investor expectations than consideration of only the arithmetic mean in a CAPM analysis.

Nevertheless, some rate of return practitioners elect to rely only on an arithmetic market risk premium in a CAPM analysis, ignoring a historical geometric market risk premium which is roughly 200 basis points lower. Also, because geometric mean return data is published by the same source (i.e., Ibbotson Associates), on the same page as the arithmetic mean, investors have access to both and, it is reasonable to assume, make use of both in determining their return requirements.

Q. IS THERE SUPPORT IN THE LITERATURE OF FINANCIAL ECONOMICS FOR THE USE OF GEOMETRIC AVERAGES OF HISTORICAL RETURNS AS THE BEST REPRESENTATION OF THE MARKET RISK PREMIUM IN THE CAPM?

A. Yes.

> "**Determining the market risk premium** The market risk premium (the price of risk) is the difference between the expected rate of return on the market portfolio and the risk free rate, $E(r_m) - r_f$. We recommend using a 5 to 6 percent market risk premium for U.S. companies. This is based on the long-run geometric average risk premium for the return on the S&P 500 versus the return on long-term government bonds from 1926 to 1992 [footnote omitted]....
>
> • We use a geometric average of rates of return because arithmetic averages are biased by the measurement period. An arithmetic average estimates the rates of return by taking a simple average of the single period rates of return.... We believe that the geometric average represents a better estimate of investors' expected returns over long periods of time....
>
> Also, the arithmetic average depends on the interval chosen. For example, an average of monthly

> returns will be higher than an average of annual returns. The geometric average, being a single estimate for the entire time interval, is nonvariant to the choice of interval. (Copeland, T., Koller, T., Murrin, J., Valuation, Measuring and Managing the Value of Companies, 2nd Ed., Wiley & Sons, New York, 1994, pp. 260-1)

Also, one of the financial publications on which investors and cost of capital analysts often rely, Value Line, advises its subscribers that the geometric mean provides an unbiased measure of historical growth while the arithmetic mean is biased upward:

> "The arithmetic average has an upward bias, though it is the simplest to calculate. The geometric average does not have any bias, and thus is best to use when compounding (over a number of years) is involved." (The Value Line Investment Survey, *Selection & Opinion*, May 9, 1997 p. 6844)

Therefore, both the arithmetic and the geometric mean are recognized in the financial literature as meaningful measures of historical returns. I recognize that there is merit to the position on the use of the arithmetic mean, and I, too, use the arithmetic average market risk premiums published by Ibbotson Associates. However, I also use the geometric mean and, in so doing, recognize that both are available to investors and both have theoretical merit.

Q. WHAT VALUES HAVE YOU CHOSEN FOR THE BETA COEFFICIENTS IN THE CAPM ANALYSIS?

A. Value Line reports beta coefficients for all the stocks it follows. Value Line's beta is derived from a regression analysis between weekly percentage changes in the market price of a stock and weekly percentage changes in the New York Stock Exchange Composite Index over a period of five years. The average beta coefficients of the sample group of gas distribution, telecom and insurance companies are 0.64, 0.96 and 0.97, respectively. [Note that the beta coefficients confirm the DCF result presented earlier that gas distributors have the lowest investment risk of the utility group and the investment risk of telecommunications companies and insurance companies is similar.]

Q. WHAT IS YOUR ESTIMATE OF THE COST OF EQUITY CAPITAL FOR THE SAMPLE GROUPS OF COMPANIES USING THE CAPITAL ASSET PRICING MODEL ANALYSIS?

A. Schedule 8, page 1, shows that the average Value Line beta coefficient for the group of gas utility companies under study is 0.64. The overall arithmetic average market risk premium of 8.8% would, upon the adoption of a 0.64 beta, become a sample group premium of 5.59% (0.64 x 8.8%). That non-specific risk premium added to the risk-free T-Bill rate of 1.63%, previously derived, yields a common equity cost rate estimate of 7.22%. Page 1 of Schedule 8 also shows that using a recent six-week average long-term T-bond yield (4.80%), the CAPM produces equity cost estimates of 8.23% (geometric) and 9.25% (arithmetic).

In the current market environment, the CAPM result based on the T-Bill yield produces a very low cost of equity estimate which is, in my view, below the Company's long-term cost of equity capital. The T-Bill CAPM results, currently, produce a return which is roughly equivalent to the Company's marginal debt costs and, thus, are not reliable as an indicator of the cost of equity capital. However, the results are informative in that they confirm that currently capital costs are, indeed, quite low by historical standards.

The CAPM results which employ the long-term Treasury yields (8.23%/9.25%) are more reasonable in the current economic environment as an estimate of the Company's cost of equity capital. As shown on pages 2 and 3 of Schedule 8, the CAPM cost of equity estimates for the telecom and insurance companies are 9.99%/11.54% and 10.02%/11.57%, respectively.

C. MODIFIED EARNINGS-PRICE RATIO ANALYSIS

Q. PLEASE DESCRIBE THE MODIFIED EARNINGS-PRICE RATIO (MEPR) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL.

A. The earnings-price ratio is calculated simply as the expected earnings per share divided by the current market price. In cost of capital analysis, the earnings-price ratio (which is one portion of this analysis) can be useful in a corroborative sense, since it can be a good indicator of the proper range of equity costs when the market price of a stock is near its book value. When the market price of a stock is *below* its book value, the earnings-price ratio *overstates* the cost of equity capital. Schedule 9 contains mathematical support for this concept. The opposite is also true; i.e., the earnings-price ratio *understates* the cost of equity capital when the market price of a stock is *above* book value.

Under current market conditions, the company groups under study have average market-to-book ratios ranging from 1.35 to 1.77 and, therefore, the average earnings-price ratio alone would understate the cost of equity for the sample group. However, it is important to emphasize that I do not use the earnings-price ratio alone as an indicator of equity capital cost rates. Because of the relationship among the earnings-price ratio, the market-to-book ratio and the investor-expected return on equity, I have modified the standard earnings-price ratio analysis by including expected returns on equity for the companies under study. It is that modified analysis, the MEPR analysis, that I will use to assist in estimating an appropriate range of equity capital costs in this proceeding.

Q. PLEASE EXPLAIN THE RELATIONSHIP AMONG THE EARNINGS-PRICE RATIO, THE EXPECTED RETURN ON EQUITY AND THE MARKET-TO-BOOK RATIO.

A. When the investor-expected return on equity for a company exceeds the investor-required return (the cost of equity capital), the market price of the firm will tend to exceed its book value. As explained above, when the market price exceeds book value, the earnings-price ratio understates the cost of equity capital. Therefore, when the expected equity return (ROE) exceeds the cost of equity capital, the earnings-price ratio will understate that cost rate.

Also, in situations where the expected equity return is below what investors require for that type of investment, market prices fall below book value. Further, when market-to-book ratios are below 1.0, the earnings-price ratio overstates the cost of equity capital. Thus, the expected rate of return on equity and the earnings-price ratio tend to move in a countervailing fashion about the cost of equity capital. When market-to-book ratios are above one, the expected equity return exceeds and the earnings-price ratio understates the cost of equity capital. When market-to-book ratios are below one, the expected equity return understates and the earnings-price ratio exceeds the cost of equity capital. Further, as market-to-book ratios approach unity, the expected return and the earnings price ratio approach the cost of equity capital. Therefore, the average of the expected book return and the earnings price ratio provides a reasonable estimate of the cost of equity capital.

These relationships represent general rather than precisely quantifiable tendencies but are useful in corroborating other cost of capital methodologies. The Federal Energy Regulatory Commission, in its generic rate of return hearings, found this technique useful and indicated that under the circumstances of market-to-book ratios exceeding unity, the cost of equity is bounded above by the expected equity return and below by the earnings-price ratio (e.g., 50 Fed Reg, 1985, p. 21822; 51 Fed Reg, 1986, pp. 361, 362; 37 FERC ¶ 61,287). The mid-point of these two parameters, therefore, produces an estimate of the cost of equity capital which, when market-to-book ratios are different from unity, is far more accurate than the earnings-price ratio alone.

Q. WHAT ARE THE RESULTS OF YOUR EARNINGS-PRICE RATIO ANALYSIS OF THE COST OF EQUITY FOR THE SAMPLE GROUP?

A. Schedule 10 shows the Zack's projected 2003 per share earnings for each of the firms in the sample group. Recent average market prices (the same market prices used in my DCF analysis), Value Line's projected 2002 return on equity and 2005-2007 equity returns for each gas distribution company are also shown.

Page 1 of Schedule 10 shows the earnings-price ratio for the gas utility sample group, 7.37%, is below the cost of equity for those companies due to the fact that their average market-to-book ratio is currently above 1.0. The gas companies' 2002 expected book equity return averages 10.55%. That return rate is likely to be above the companies' cost of equity capital, again due to the fact that the market prices for those firms are above their book values. For the gas utility sample group, then, the mid-point of the earnings-price ratio and the current equity return is 8.96%. Schedule 10, page 1 also shows that, for the group of gas utility companies studied, the average expected book equity return over the next three- to five-year period is projected to average 12.70%. The midpoint of these two boundaries of equity capital cost for the whole group, i.e., the long-term projected return on book equity (12.70%) and the current earnings-price ratio (7.37%) is 10.03%, and provides another forward-looking estimate of the equity capital cost rate of a gas distribution firm. The results of the longer-term MEPR analysis for electric companies confirms the reasonableness of my DCF analysis.

For the telecommunications holding companies and the insurance companies, pages 2 and 3 of Schedule 10 show the modified earnings-price ratio analysis indicating equity capital costs of 13.49% to 12.86% (telecom) and 9.9% to 11.27% (insurance). These results indicate are both above and below my DCF equity cost estimate for the telecom and insurance companies.

D. MARKET-TO-BOOK RATIO ANALYSIS

Q. PLEASE DESCRIBE YOUR MARKET-TO-BOOK (MTB) ANALYSIS OF THE COST OF COMMON EQUITY CAPITAL FOR THE SAMPLE GROUP.

A. This technique of analysis is a derivative of the DCF model that attempts to adjust the capital cost derived with regard to inequalities that might exist in the market-to-book ratio. This method is derived algebraically from the DCF model and, therefore, cannot be considered a strictly independent check of that method. However, the MTB analysis is useful in a corroborative sense. The MTB seeks to determine the cost of equity using market-determined parameters in a format different from that employed in the DCF analysis. In the DCF analysis, the available data is “smoothed” to identify investors’ long-term sustainable expectations. The MTB analysis, while based on the DCF theory, relies instead on point-in-time data projected one year and five years into the future and, thus, offers a practical corroborative check on the traditional DCF. The MTB formula is derived as follows:

Solving for “P” from Equation (1), the standard DCF model, we have

$$P = D/(k-g). \qquad (6)$$

But the dividend (D) is equal to the earnings (E) times the earnings payout ratio, or one minus the retention ratio (b), or

$$D = E(1-b). \qquad (7)$$

Substituting Equation (7) into Equation (6), we have

$$P = \frac{E(1-b)}{k-g} . \qquad (8)$$

The earnings (E) are equal to the return on equity (r) times the book value of that equity (B). Making that substitution into Equation (8), we have

$$P = \frac{rB(1-b)}{k-g} . \qquad (9)$$

Dividing both sides of Equation (9) by the book value (B) and noting from Equation (iii) in Appendix B that g = br+sv,

$$\frac{P}{B} = \frac{r(1-b)}{k-br-sv} . \qquad (10)$$

Finally, solving Equation (10) for the cost of equity capital (k) yields the MTB formula:

$$k = \frac{r(1-b)}{P/B} +br+sv. \qquad (11)$$

Equation (11) indicates that the cost of equity capital equals the expected return on equity multiplied by the payout ratio, divided by the market-to-book ratio plus growth. Schedule 11 shows the results of applying Equation (11) to the defined parameters for the utility firms in the comparable sample groups. Pages 1, 3 and 5 of Schedule 11 utilize current year (2002) data for the MTB analysis while Pages 2, 4 and 6 of Schedule 11 utilize Value Line's 2005-2007 projections.

The MTB cost of equity for the sample of gas distribution utility firms, adjusted for a current average market-to-book ratio of 1.63 is 10.28% using the current year data and 10.89% using projected three- to five-year data. The near-term projections understate my DCF, but the longer-term MTB results overstate my DCF results for the gas companies.

For the telecom and insurance companies under study, Schedule 11 shows that the MTB cost of equity estimates range from 12.61% to 11.75% (telecom) and 12.02% to 11.88% (insurance).

E. SUMMARY

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR EQUITY CAPITAL COST ANALYSES FOR THE SAMPLE GROUP OF SIMILAR-RISK COMPANIES.

A. My analysis of the cost of common equity capital for the sample group of utility companies is summarized in the table below.

	Gas	Telecom	Insurance
DCF	10.46%	12.25%	11.92%
CAPM	8.23%/9.25%	9.99%/11.54%	10.02%/11.57%
MEPR	8.96%/10.03%	13.49%/12.86%	9.90%/11.27%
MTB	10.28%/10.89%	12.61%/11.75%	12.02%/11.88%

The DCF result for gas distribution utilities noted above, which is my primary indication of the *lower bound* of the cost of equity capital, is 10.46%. Averaging the highest results of each of the corroborative analyses (CAPM, MEPR, and MTB) produces an equity cost rate of 10.05%—a result that is below the DCF. In fact, only the projected MTB results are above the DCF estimate; all of the other corroborative analyses indicate that my DCF results may overstate the actual cost of common equity of gas distributors. Therefore, weighing all the evidence presented herein, my best estimate of the cost of equity capital for a company facing similar risks as that group of electric utility companies ranges from 10.0% to 10.50%.

For the telecom companies, the DCF result is 12.25%, and the average of the lowest and highest results of the CAPM, MEPR and MTB analysis ranges from 11.53% to 12.54%. The DCF result for the insurance companies (which are used here as another proxy for the telecommunications companies) is 11.92%. And the average of the lowest and highest estimates of the corroborative analyses ranges from 10.60% to 11.62%. Only one of the corroborative analysis (the near-term MTB) indicates an equity cost near the DCF. The market-based equity cost estimate results of the telecom and insurance companies indicate an equity cost range of 11.75% to 12.25% is reasonable for that risk-class.

Therefore, using the upper bound of a reasonable range of equity cost estimates for gas distributors of 10.50% and the lower bound of a reasonable range of equity cost estimates for telecom holding companies, 11.75%, the cost of equity capital of a local exchange telecommunications company can be said to fall between 10.50% and 11.75%. Given that very broad range, in combination with the evidence presented previously regarding the similarity of local exchange operations to gas utility operation and the lower risk of local exchange operations compared to diversified telecommunications holding company operations, the lower portion of that range of equity capital cost rates, 10.50% to 11.125%, represents a reasonable range of the cost of equity capital of Verizon-New Hampshire telephone operations. That range of equity returns is entirely above that currently appropriate for gas distribution operations (thus recognizing the higher technological risks of telephone operations), below the return appropriate for diversified telecom holding companies and other firms which are similar in risk to the stock market generally (insurance companies), and is, therefore, reasonable for ratesetting purposes.

Q. DOES YOUR EQUITY COST ESTIMATE INCLUDE AN INCREMENT FOR

FLOTATION COSTS?

A. No, it does not.

Q. CAN YOU PLEASE EXPLAIN WHY AN EXPLICIT ADJUSTMENT TO THE COST OF EQUITY CAPITAL FOR FLOTATION COSTS IS UNNECESSARY?

A. An explicit adjustment to "account for" flotation costs is unnecessary for several reasons. First, there is no information in the evidence presented by the Company in this case that indicates that it anticipates a public stock offering. Absent such an offering, the Company will not incur flotation costs going forward and should not be reimbursed for a cost it will not incur. Moreover, any attempt to collect equity financing costs incurred in prior periods would amount to retro-active ratemaking.

Second, assuming *arguendo* the need for an issuance expense adjustment to the cost of equity, the majority of the issuance expenses incurred in any public offering are "underwriter's fees" or "discounts." Underwriter's discounts are not out-of-pocket expenses for the issuing company. On a per share basis, they represent only the difference between the price the underwriter receives from the public and the price the utility receives from the underwriter for its stock. As a result, underwriter's fees are not an expense incurred by the issuing utility and recovery of such "costs" should not be included in rates. Moreover, the amount of the underwriter's fees are prominently displayed on the front page of every stock offering prospectus and, as a result, the investors who participate in those offerings (e.g., brokerage firms) are quite aware that a portion of the price they pay does not go to the company but goes, instead, to the underwriters. By electing to buy the stock with that knowledge, those investors have effectively accounted for those issuance costs in their risk-return framework by paying the offering price. Therefore, they do not need any additional adjustments to the allowed return of the regulated firm to "account" for those costs.

Third, my DCF growth rate analysis includes an upward adjustment to equity capital costs which accounts for investor expectations regarding stock sales at market prices in excess of book value, and any further explicit adjustment for issuance expenses is unnecessary.

Fourth, research[12] has shown that a specific adjustment for issuance expenses is unnecessary. There are other transaction costs which, when properly considered, eliminate the need for an explicit issuance expense adjustment to equity capital costs. The transaction cost that is improperly ignored by the advocates of issuance expense adjustments is brokerage fees. Issuance expenses occur with an initial issue of stock in a primary market offering. Brokerage fees occur in the much larger secondary market where pre-existing shares are traded daily. Brokerage fees tend to increase the price of the stock to the investor to levels above that reported in the *Wall Street Journal*, i.e., the market price analysts use in a DCF analysis. Therefore, if brokerage fees were included in a DCF cost of capital estimate, they would raise the effective market price, lower the dividend yield and lower the investors' required return. If one considers transaction costs which, supposedly, raise the required return (issuance expenses), then a symmetrical treatment would require that costs which lower the required return (brokerage fees) should also be considered. As shown by the research noted above, those transaction costs essentially offset each other and no specific equity capital cost adjustment is warranted.

Q. WHAT IS THE OVERALL COST OF CAPITAL FOR V-NH's NETWORK OPERATIONS, BASED ON AN ALLOWED EQUITY RETURN OF 11.125%, AND YOUR RECOMMENDED FORWARD-LOOKING CAPITAL STRUCTURES?

A. Schedule 12 attached to my testimony shows that, with an allowed return on equity capital of 11.125%, using both a book value capital structure and a market value capital structure, Verizon-New Hampshire's overall cost of capital would range from 8.741% to 9.608%. The mid-point of that range is an overall return of 9.175%.

Q. DOES THIS CONCLUDE YOUR ANALYSIS OF THE COMPANY'S OVERALL COST OF CAPITAL?

A. Yes, it does.

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[12] "A Note on Transaction Costs and the Cost of Common Equity for a Public Utility," Habr, D., National Regulatory Research Institute Quarterly Bulletin, January 1988, pp. 95-103.

IV. V-NH's COST OF CAPITAL TESTIMONY

Q. WHAT METHODS HAS COMPANY WITNESS VANDER WEIDE USED TO DETERMINE EQUITY CAPITAL COSTS IN THIS PROCEEDING?

A. Company witness Vander Weide based his equity return recommendation in this proceeding on the results of two analyses. First, Dr. Vander Weide estimates the cost of equity capital for a subset of the S&P 500 Industrials and used that result (14.13%), along with a hypothetical market-based capital structure and the marginal cost of debt, to derive an overall return of 12.45% (Vander Weide Direct, p. 53). Second, Dr. Vander Weide assumes that offering UNE leasing services in New Hampshire can be proxied as a stock option and uses that assumption to derive an overall return of 17.93% for the provision of those services. If Verizon-New Hampshire is capitalized with about 45% common equity and 55% debt as it has been over the past couple of years, Dr. Vander Weide's recommended overall return would produce an equity return for the Company of approximately 30% [(17.93% - 55% x 7.40% (marginal cost of debt))/ 45% (equity ratio) = 30.8%][13].

Dr. Vander Weide's equity return recommendation in this proceeding, to put it diplomatically, is substantially overstated. The Company's equity return recommendation is also flawed for many reason. I will discuss the infirmities in Dr. Vander Weide's DCF analysis initially, and then discuss the problems with the witness' stock option/lease assumption.

Q. WHAT ARE YOUR COMMENTS REGARDING DR. VANDER WEIDE'S DCF SAMPLE GROUP SELECTION PROCESS?

A. At page 52 of his Direct Testimony in this proceeding, Dr. Vander Weide states that the risk of the S&P Industrials, on average, approximates the risk of local exchange companies. However, he provides no factual support for that assumption. In addition, the sample group used by Dr. Vander Weide apparently contains only 108 companies, while the S&P Industrial index contains far more companies than the 108 used by the Company witness. In appears then, that Dr. Vander Weide has eliminated many companies from the S&P Index but has provided no rationale for doing so.

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[13] As I show on page 2 of Schedule 2 attached to this testimony, if Dr. Vander Weide's overall return is applied to Verizon Communications' book capital structure, the resulting ROE would be even higher because the parent company carries less common equity as a percent of total capital than does V-NH.

It also appears that Dr. Vander Weide has elected to eliminate telecommunications companies from consideration in his DCF calculation of the cost of equity capital. For example, in his response to Staff 1-1a, Dr. Vander Weide lists several telecommunications companies which are included in the S&P Industrial index (e.g., CenturyTel, BellSouth, SBC Corp, Verizon), but those companies are excluded in his calculation of the DCF cost of equity. Again, Dr. Vander Weide does not bother to explain in his Direct Testimony why he elected not to consider any direct DCF evidence related to telecommunications companies[14].

While, as I have noted in my testimony, telecommunications holding companies carry greater investment risk than local exchange telephone companies due to their diversification into riskier activities, those firms do derive some revenues from local exchange operations. It would seem reasonable, therefore, to utilize market-based cost of equity information related to those telecommunications firms to assist in developing a reasonable estimate of the cost of equity for local exchange telephone operations. However, Dr. Vander Weide has actively excluded any such information from consideration in his analysis of the cost of equity capital and, because of that fact, his results overstate the cost of capital appropriate for local exchange telephone operations.

In sum, Dr, Vander Weide has selected a sample group of firms for his DCF analysis in this proceeding which, in my view, carry considerably more risk than a local exchange telephone company. As a result the first step in his determination of a final recommendation in this proceeding—his DCF analysis—produces overstated results.

Q. ON WHAT DCF MODEL HAS THE COMPANY RELIED TO PROVIDE AN ESTIMATE OF ITS EQUITY CAPITAL COST RATE?

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[14] Dr. Vander Weide has considered market-based DCF results for telecommunications companies in prior testimony.

A. Company witness Vander Weide uses the following DCF formulation to estimate equity capital costs:

$$k = \left[\frac{d_0(1+g)^{1/4}}{P_0(1\text{-}FC)} + (1+g)^{1/4}\right]^4 - 1 \qquad (12)$$

The Company terms its version of the DCF the "quarterly DCF" model. This particular version of the DCF model produces cost of equity results which are higher than the standard DCF model ($k = D_1/P_0 + g$). It has been my experience that the quarterly model used by Dr. Vander Weide overstates the cost of equity by approximately 30 basis points.

Aside from the obvious mathematical complexity of this model, which makes it doubtful that the average investor actually uses it, this version of the DCF model implicitly assumes that dividends increase every quarter. However, that is not the manner in which dividends are actually paid out by utilities. Usually, after dividends are raised, they are kept at a constant level for several quarters. It would be very unusual that any of the companies analyzed by the Company witness raised its dividend every quarter. Dr. Vander Weide's assumption of a dividend increase every quarter, therefore, overstates investor expectations. Also, as noted previously in my testimony, since the DCF is derived as a quarterly model, it requires no additional "adjustments" and the proper dividend to use in the model is the expected next quarter dividend, annualized. If the dividend has regularly been increased in the quarter following analysis, then the current quarterly dividend should be increased by one plus the annual growth rate and then annualized to calculate the DCF dividend yield. However, the dividend does not increase every quarter nor do investors expect it to do so.

Witness Vander Weide's rationale supporting a constantly increasing dividend is grounded on the ability of investors to reinvest those dividends every quarter in equivalent risk/return investments to earn the incremental "time value of money". That may or may not represent the action of investors. Regardless, it is not the ratepayers' responsibility to provide the investor any additional return he or she might receive by reinvesting the quarterly dividend.

In addition, the Company's logic is circular. If, for example, the Commission allowed a higher equity return based on that reinvestment logic, and the higher return translated into a larger dividend, the investor could then take the higher return (in the form of a larger dividend) and reinvest it — expecting a still higher return. Then, would it not be that higher return — drawn from reinvesting those larger dividends — that he or she really expects? Should rates not, therefore, be based on the expectation of compounding the new, larger dividend? The Company's compounding treatment, if taken literally, would have investors expecting and regulators awarding higher and higher rates of return to account for larger and larger dividends. It is circular and without merit.

The Federal Energy Regulatory Commission, in its Generic Rate of Return rulemaking proceedings held during the 1980s and early 1990s, has considered and rejected the use of a DCF model which compounds the quarterly dividend. The FERC held in Order 461 (37 FERC ¶61,287) that if the allowed return were determined using a DCF model which included the dividend compounding recommended by Company witness Vander Weide, the investors would be compensated twice, "--once by the utility [through the allowed rate of return] and once through the investors' reinvestment of the dividends in some other alterative investment."

Finally, Dr. Vander Weide's DCF model also includes an upward adjustment for flotation costs (the "FC" in Equation 12 is a flotation cost adjustment and is subtracted from the market price of the stock)[15]. I have previously outlined the reasons why an explicit allowance for flotation costs is unnecessary, and will not revisit that logic here.

Q. HOW HAS DR. VANDER WEIDE ELECTED TO ESTIMATE THE GROWTH RATE PORTION OF HIS DCF ANALYSES?

A. For his DCF, Dr. Vander Weide elects to rely solely on projected earnings per share growth rates for each of the companies in his sample group. That type of DCF analysis is not well-balanced in that it does not consider other growth rate data available to investors, which indicate lower growth. Dr. Vander Weide's heavy reliance on only projected earnings growth, then, causes his DCF results to be overstated.

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[15] It is interesting to note that although Dr. Vander Weide does not include the "FC" variable in the formula appearing on his Exhibit JVW-1, the "FC' variable is defined in the footnotes and it is included in his calculation of the DCF cost of equity.

Q. WHAT ARE YOUR COMMENTS ON THE EXCLUSIVE USE OF PROJECTED EARNINGS GROWTH RATES IN A DCF ESTIMATE OF THE COST OF EQUITY CAPITAL?

A. In my view, earnings growth rate projections are widely available, are used by investors and therefore deserve consideration in an informed, accurate assessment of the investor expected growth rate to be included in a DCF model. I do not believe, however, that projected earnings growth rates should be used as a primary measure of growth as Dr. Vander Weide has elected to do in his DCF. In other words, projected earnings growth rates are influential in, but not the only factor that is determinative of, investor expectations.

Q. PLEASE EXPLAIN WHY EXCLUSIVE RELIANCE ON ANALYSTS' PROJECTED EARNINGS GROWTH RATES IN A DCF EQUITY COST ESTIMATE CAN PRODUCE UNRELIABLE RESULTS.

A. First, it is important to realize that projected growth rates may over- or understate growth that can be sustained over time by the companies under review. This is important because sustainable growth is required in an accurate DCF assessment of the cost of equity capital. The efficacy of projected earnings growth rates in any specific DCF analysis can only be determined through a study of the underlying fundamentals of growth—something which Company witness Vander Weide fails to do with his sole reliance on analysts' earnings growth rate projections.

Second, there is often associated with the exclusive use of analysts' projected earnings growth rates an erroneous notion of "consensus," i.e., that projected earnings growth rates are precisely what investors are using to estimate return requirements and that those estimates closely agree. However projected earnings growth rates are an average or median of growth rates which, in reality, are quite divergent. Dr. Vander Weide does not provide the ranges of the earnings growth estimates for his companies, but my experience with such data is that the growth rate opinions of the sell-side analysts polled by firms like I/B/E/S and Zack's can vary widely.

Finally, as evidenced in financial news headlines earlier this year (e.g., the legal action against Merrill Lynch by the Attorney General of New York), the sell-side institutional analysts that are polled by IBES and Zack's and similar services sometimes offer relatively "rosy" expectations for the stock they follow—even when the analyst's actual expectations for the stock are not so sanguine. Simply put, some analysts are overstating growth expectations to make the stocks look better. Although claims are often made that the opinions of sell-side analysts are not affected by the profits made by the other parts of the business that actually trade those securities, the recent events in the marketplace underscore that concern. Therefore, while what is known as the "Cinderella effect" (analysts' overstating stock expectations) is not a new phenomenon, the recent concern in the financial markets regarding this issue underscores the need for caution in the use of earnings growth expectations in estimating the cost of equity capital.

Q. DON'T WITNESSES WHO RELY EXCLUSIVELY ON EARNINGS GROWTH PROJECTIONS CITE ACADEMIC STUDIES WHICH SHOW ANALYSTS' EARNINGS GROWTH ESTIMATES TO BE "SUPERIOR" TO OTHER GROWTH RATE ESTIMATION METHODS?

A. Yes, and Dr. Vander Weide is the author of one of those studies. However, while such studies do show that projected growth rates are superior to simple, mechanical averages of historical growth rates, they do not in any way suggest that projected earnings growth rates, alone, are determinative of investor expectations. What those studies actually do is make a good case for the consideration of analysts' growth rate forecasts in a reasoned examination of investor growth rate expectations. I agree with that premise, and that is how I use analysts forecasts in my DCF analyses, i.e., as part of an analysis of growth rate expectations. Those studies do not, however, provide a rationale for an *exclusive* reliance in earnings growth rate projections. Certainly analysts' growth rate projections can influence investor expectations, but it is unreasonable to conclude, as Dr. Vander Weide does, that they determine those expectations exclusively.

Finally on this point, Dr. Vander Weide in prior testimony in a different regulatory jurisdiction has admitted that his use of projected earnings data is intended as a surrogate for dividend growth (North Carolina Automobile Insurance Rate Proceeding, Docket No. 942, 1999 Auto Rate Filing, Tr. 1431, 1432). It is curious, therefore, that in attempting to assess investors' dividend growth expectations, Dr. Vander Weide elects to ignore other data (such as projected dividend growth rates which are available in Value Line), and elects to rely only on projected earnings growth.

Q. IF DR, VANDER WEIDE HAD PERFORMED A DCF ANALYSIS OF TELECOMMUNICATIONS FIRMS USING ONLY PROJECTED EARNINGS GROWTH, WHAT WOULD HAVE BEEN THE APPROXIMATE RESULT?

A. Schedule 5, page 4 attached to this testimony shows that the average projected earnings growth rate for BellSouth, CenturyTel, SBC Corp., and Verizon is 7.48%[16]. Page 2 of Schedule 6 also shows that the average forward looking dividend yield of those companies is 3.54%. Therefore, for those telecommunications firms for which local exchange operations comprise a significant portion of revenues, an earnings-based DCF result would indicate a cost of equity of 11.02% (3.54% = 7.48%). Therefore, if the sole use of projected earnings growth rates provides reliable DCF estimates, Dr. Vander Weide would have to admit that his equity return recommendation in this proceeding substantially overstates the cost of equity capital for telecommunications firms.

Q. DOES THAT CONCLUDE YOUR COMMENTS REGARDING DR. VANDER WEIDE'S DCF ANALYSIS?

A. Yes, it does.

Q. YOU NOTED AT THE OUTSET OF YOUR DISCUSSION OF DR. VANDER WEIDE'S TESTIMONY THAT THE SECOND STEP OF HIS ANALYSIS WAS TO

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[16] Dr. Vander Weide uses 5-year earnings projections from I/B/E/S. The earnings growht rates cited in my testimony are from Zack's, another investor service that polls sell-side analysts. Usually, I/B/E/S earnings growth projections and Zack's earnings growth projections are very similar.

ASSUME THAT LEASING UNE'S WAS LIKE THE PURCHASE OF A STOCK OPTION, CORRECT?

A. Yes, that's correct.

Q. DR. VANDER WEIDE HAS TESTIFIED ON THE SUBJECT OF THE COST OF CAPITAL IN UNE PROCEEDINGS MANY TIMES, HAS HE NOT?

A. Yes. In response to BR/Conv. 1-1, Dr. Vander Weide lists approximately 40 UNE proceedings in which he has testified since 1996.

Q. IN ANY OF THOSE PROCEEDINGS HAS DR. VANDER WEIDE TESTIFIED THAT THE COST OF LEASING UNE's COULD BE PROXIED USING STOCK OPTION THEORIES?

A. No. As Dr. Vander Weide notes in response to BR/Conv. 1-6, this is the first jurisdiction in which he has recommended a risk premium to account for what he believes is the substantial additional risk of leasing UNE's. Therefore, in all of the other UNE proceedings in which he has testified since 1996, Dr. Vander Weide has estimated the equity capital cost of offering UNE's by estimating the DCF cost of equity of a market index like the S&P Industrials. Moreover, in all 40 of the prior UNE proceedings, Dr. Vander Weide's recommended cost of equity for the provision of UNE service has been in the range of 14.30% to 15.10%. In the instant proceeding, as I have noted above, Dr. Vander Weide recommends an overall return that will produce in excess of a 30% return on equity for V-NH.

Finally, according to Dr. Vander Weide's Supplemental Direct Testimony, his first-step DCF analysis (which was his end-result in all of his prior UNE testimony) is representative of V-NH's cost of equity capital in traditional rate proceedings. However, I am aware of no regulatory body that utilizes market-based capital structures to set rates in traditional rate-of-return/rate base proceedings. Therefore, even if Dr. Vander Weide's equity cost estimate for the S&P Industrials were accurate and appropriate to use as a proxy for Verizon-New Hampshire (neither of which is the case) his recommendation would be unreliable for a traditional rate proceeding due to his reliance on a market-based capital structure.

Q. HAVE THE THEORIES ON WHICH DR. VANDER WEIDE BASES HIS NEW ANALYSIS OF UNE COST OF CAPITAL BEEN RECENTLY DEVELOPED?

A. No. The authority on which Dr. Vander Weide relies for his operating lease/stock option theory is an article from *Financial Management,* first published in 1982—twenty years ago. Therefore, the theories on which Dr. Vander Weide elects to base his analysis in this proceeding existed long before the advent of UNE rate proceedings. Dr. Vander Weide elected not to rely on those theories in the past, but chooses to do so now and, in the process, doubles his return on equity recommendation. In my view, Dr. Vander Weide's recent adoption of a long-existing theory—one that he has previously repeatedly ignored— must be viewed with suspicion, given the very dramatic upward impact it has on the resultant equity return recommendation.

Q. DO YOU BELIEVE IT IS REASONABLE TO ASSUME THAT LEASING UNBUNDLED NETWORK ELEMENTS IS SIMILAR TO PURCHASING A STOCK OPTION?

A. No. There are several reasons why Dr. Vander Weide's newly-adopted assessment of the risk of leasing unbundled network elements and the 500+ basis point increase in the overall cost of capital associated with that assessment are unreliable for ratemaking purposes.

First, it is important to understand the assumptions under which Dr. Vander Weide now elects to view the provision of unbundled network elements. Dr. Vander Weide assumes that the provision of unbundled network elements is the same as an operating lease in which the network has been built for the sole purpose of leasing to competitive local exchange carriers (CLECS). If the network is leased, the lessor (Verizon) realizes a positive cash flow from the operation of the network and if it is not leased the lessor receives nothing. Dr. Vander Weide then makes the assumption that the operating lease and the required return to the lessor can be estimated by assuming that the lease is similar to a put option with a declining exercise price.

However, the assumptions on which Dr. Vander Weide's new lease/stock option theory rests do not comport with reality. Verizon makes quite clear in its response to BR/Conv. 1-10 that it does not build UNEs for CLECs:

> "(b) Does Verizon deploy facilities upon a CLEC request for a given UNE and/or when there are no UNE facilities available?
>
> Reply: No.
>
> (c) Has Verizon specifically made separate network investments to provide UNEs to CLECs that would not have been made except for the need to service CLECs? If yes, please state the total amount of such investment both to Verizon consolidated, and to Verizon in New Hampshire.
>
> Reply: No."

In other words, Verizon's network is built for its own purposes and the Company does not build plant in order to provide network elements to CLECs. In the above-cited data response the Company makes quite clear that it will lease portions of its network which, we must assume, were built to provide service to its traditional customer base, but it will not build additional network elements in order to lease them to CLECs. Therefore, the central assumption on which Dr. Vander Weide's new risk premium analysis rests—i.e., network elements are built for the purpose of leasing to CLECs—is not a viable representation of reality.

In fact, if we make the assumption that Verizon's existing network in New Hampshire is built to serve its traditional customer base and the cost of that network is being recovered through rates charged to those traditional customers, then the leasing of network elements is a very low risk endeavor, indeed. If the network is already being paid for by V-NH's traditional customers, then any additional monies raised through leasing portions of that network to CLEC's simply improves Verizon's profitability, with no additional risk to the Company. Under that assumption, which in my view is certainly as plausible as Dr. Vander Weide's operating lease scenario, network leasing would be a very low risk operation.

As is usually the case with polar opposite views of any subject, the truth probably lies somewhere between the two extremes set out above. In this case, the actual cost of capital which should be associated with leasing UNEs lies between Dr. Vander Weide's high risk, high return assumptions and the notion that network leasing revenues are risk-free dollars to Verizon. Therefore, the most reasonable approach for the purposes of determining the cost of UNE's is to apply the cost of capital appropriate for local exchange telephone operations, as I have done in this testimony—and as Dr. Vander Weide has done in all of his prior testimony on this subject.

Q. ARE THERE OTHER REASONS THAT YOU BELIEVE DR. VANDER WEIDE'S ADDITIONAL LEASING/STOCK OPTION RISK PREMIUM SHOULD NOT BE ADOPTED IN THIS PROCEEDING?

A. Yes. First, its is not reasonable, in my view, to assume that leasing portions of a telephone network can be modeled as a stock option. A telephone network is a tangible investment which necessarily has some intrinsic economic and societal value as an on-going business enterprise or it would not have been built. Stock options are purely speculative investments. A stock option investor is betting on the accuracy of his or her opinion regarding the future price of a particular stock. As we all know from the recent World Com experience a stock has value only if the market thinks it has value; the network, on the other hand, continues to function and generate positive cash flow. In my view, the premise of the Copeland, Weston article on which Dr. Vander Weide basis his risk premium analysis—i.e., that leasing UNE's is similar to the purchase of a stock option—is not a logically appealing one.

Second, Dr. Vander Weide appears to have used an option price for Verizon in his risk premium analysis and applies that price to the economic life of Verizon's New Hampshire local exchange telephone network, which, of course, has a different risk profile than Verizon Communications. However, stock options are relatively short-term in nature—from a few weeks up to nine months. There are some options sold which are for periods of up to two years, but I am aware of no stock options which purport to have a duration of 16 years (the period assumed to be the economic life of the network by Dr. Vander Weide). The reason that most stock options are relatively short-term is that option investors are betting they can precisely predict stock prices in the future, and the farther in the future the stock price must be predicted, the riskier the "bet." Therefore, no one buys stock options for 16 years, and Dr. Vander Weide's model which effectively assumes that they do, in so doing necessarily assigns too much risk to the network leasing process. Again, the assumptions included in Dr. Vander Weide's risk premium lease/option analysis do not comport with reality.

Third, another key assumption in Dr. Vander Weide's lease/option/risk premium analysis is that, at some point, the network will not be leased. However, that assumption runs counter to the assumption of fully-competitive markets, which Dr. Vander Weide also emphasizes. Fully-competitive markets for UNE's, by definition, have many similar-sized competitors vying for space on the network. In that situation, if one company is unable to fulfill its obligation to lease network elements, another competitor will be there to do so. Therefore, if there is full competition, in my view, it is unreasonable to believe the network will not be leased. In that situation, according to the authority on which Dr. Vander Weide bases his analysis, the operating lease becomes a financial lease. As the Copeland, Weston article notes, a financial lease is a perfect substitute for debt. That logic implies that the cost of leasing network elements in a fully-competitive environment would be closer to Verizon's cost of debt (≈ 7.0%) rather than the 30+% estimated by Dr. Vander Weide's risk premium analysis.

Fourth, as recently as December 2001, Dr. Vander Weide provided testimony on behalf of Verizon regarding the cost of capital to be used in determining UNE costs and did not recommend the use of a 500 basis point addition to the overall cost of capital (Verizon Response to BRConv. 1-1). It is simply not reasonable to believe that the cost of equity related to leasing network elements has not doubled in the last year—the only thing that has changed is the assumptions under which Dr. Vander Weide elects to veiw the provision of those services.

In sum, I do not believe Dr. Vander Weide's risk premium analysis which adds more than 500 basis points to the overall cost of capital of a local exchange telephone company provides a reliable basis on which forward-looking ÜNE rates should be set. This Commission should afford that analysis no weight in its decision with regard to the return that should be allowed in this proceeding.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY, MR. HILL?

A. Yes, it does.